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ABSTRACT

The training package is designed to present the basic principles of pesticide use, handling, and application. Included in this package is information on Federal laws and regulations, personal safety, environmental implications, storage and disposal considerations, proper application procedures, and fundamentals of pest management. Successful corpletion of these training modules will equip the student with the basic requirements for private applicator pesticide certification as identified by Federal laws. The 11 training modules cover the following areas: an introduction; pests; environmental protection; pesticides; labels and labeling; personal safety and first aid; safety before, during, and following application; formulation and application; equipment and its use; disposal and storage; and recordkeeping and liability. Each unit is planned for one or more lesson or class period and includes behavioral objectives, suggested activities for teacher and student, information sheets, assignments sheets, visual aids, tests and test answers. (Author/BP)

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PRINCIPLES OF PESTICIDE USE, HANDLING, AND APPLICATION

Instructional Modules for Vocational Agriculture Education

Developed for
Office of Pesticide Programs
Environmental Protection Agency
Under
Contract No. 68-01-1936
January, 1976

By
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Grateful acknowledgement for critical review of the material is extended to the members of the Working Group on Training of the Extension Committee on Policy, Extension Service, United States Department of Agriculture and to other extension service personnel throughout the country. Appreciation is also expressed to those persons in the United States Office of Education, Department of Health, Education, and Welfare and in the state departments of vocational education for their relevant suggestions for these modules.

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FOREWORD

This training package is designed to present the basic principles of pesticide use, handling, and application. Included in this package is information on federal laws and regulations, personal safety, environmental implications, storage and disposal considerations, proper application procedures, and fundamentals of pest management. Successful completion of these training modules will equip the student with the basic requirements for private applicator pesticide certification as identified by federal laws.

This training package is designed in modular form suitable for use by men and women studying vocational agriculture education. These modules form a complete self-contained training program sufficient to train and test knowledge and skills of the safe and correct use of pesticides.

This training package presents basic concepts and principles of pesticide use and application. The student must recognize that individual exceptions to these principles exist and that label instructions should be followed if a discrepancy arises.

USE OF THIS PUBLICATION

Instructional Units

Federal law requires that individuals who are applicators of restricted use pesticides be certified by October, 1977, and thereafter. These instructional modules will train prospective private pesticide applicators to meet the certification requirements under the federal guidelines. The information contained in these instructional modules is also pertinent to all persons interested in pesticide use, handling, and application.

The modules cover eleven content areas. Each area consists of one unit of instruction including behavioral objectives, suggested activities for teacher and student, information sheets, assignment sheets, visual aids, tests, and answers to the tests. Units are planned for one or more lessons or class periods of instruction.

Careful study of each instructional unit by the teacher will help to determine:

- A. The amount of material that can be covered in each class period.
- B. The skills which must be demonstrated.
    - 1. Supplies needed
    - 2. Equipment needed
    - 3. Amount of practice needed
- C. Supplementary materials that must be ordered, such as pamphlets, slide series, video tapes, movies, and filmstrips.
- D. Resource people who must be contacted.

Objectives

Each unit of instruction is based on behavioral objectives. These objectives state the goals of the unit, thus providing a sense of direction and accomplishment for the student.

Behavioral objectives are stated in two forms. Terminal objectives state the subject matter to be covered in a unit of instruction and specific objectives state the student performance necessary to reach the terminal objective.

Since the objectives of the unit provide direction for the teaching-learning process, it is important for the teacher and students to have a common understanding of the intent of the objectives. A limited number of performance terms have been used in the objectives for this curriculum to assist in promoting the effectiveness of the communication among all individuals using the materials.

Following is a list of performance terms and their synonyms which were used in this material.

Name
Label
List in writing
List orally
Letter
Record
Repeat
Give

Identify
Select
Mark
Point out
Pick out
Choose
Locate

Describe
Define
Discuss in writing
Discuss orally
Interpret
Tell how
Tell what
Explain

Order
Arrange
Sequence
List in order
Classify
Divide
Isolate
Sort

Distinguish
Discriminate

Reading of the objectives by the student should be followed by a class discussion to answer any questions concerning performance requirements for each instructional unit.

Teachers should consult state and local experts frequently to maintain updated information with regard to federal, state, and local laws and regulations. Teachers are especially encouraged to contact the State Extension Pesticide Applicator Training Coordinators for specific state requirements and laws relating to pesticide certification programs and to add objectives as needed. When a teacher adds objectives, information and assignment sheets, transparencies, and criterion tests should be supplied.

Suggested Activities

Each unit of instruction has a suggested activities sheet outlining steps to follow in accomplishing specific objectives. The activities are listed according to whether they are the responsibility of the instructor or the student.

> Instructor: Duties of the instructor will vary according to the particular unit. However, for best use of the material they should include the following: provide students with objective sheet, information sheet, and assignment sheets; make transparencies and arrange for resource materials and people; discuss terminal and specific objectives and information sheet; give test. Teachers are encouraged to use any additional instructional activities and teaching methods to aid students in accomplishing the objectives.
>
> Student: Student activities are listed which will help the student to achieve the objectives for the unit.

Information Sheets

Information sheets provide content essential for meeting the cognitive (knowledge) objectives of the unit. The teacher will find that information sheets serve as an excellent guide for presenting the background knowledge necessary to develop the skills specified in the terminal objective.

Students should read the information sheets before the information is discussed in class. Students may take additional notes on the information sheets.

Transparency Masters

Transparency masters provide information in a special way. The students may see as well as hear the material being presented, thus reinforcing the learning process. Transparencies may present new information or they may reinforce information presented in the information sheets. They are particularly effective when identification is necessary.

Transparencies should be made and placed in the notebook where they will be immediately available for use. Transparencies direct the class's attention to the topic of discussion. They should be left on the screen only when topics shown are under discussion. (NOTE: Stand away from the overhead projector when discussing transparency material. The noise of the projector may cause the teacher to speak too loudly.)

Assignment Sheets

Assignment sheets give direction to study and furnish practice for paper-pencil activities to develop the knowledge which is a necessary prerequisite to skill development. These may be given to the student for completion in class or used for homework assignments. Answer sheets are provided which may be used by the student and/or teacher for checking student progress.

Test and Evaluation

Paper-pencil and performance tests have been constructed to measure student achievement of each objective listed in the unit of instruction. Individual test items may be pulled out and used as a short test to determine student achievement of a particular objective. This kind of testing may be used as a daily quiz and will help the teacher spot difficulties being encountered by students in their efforts to accomplish the terminal objective. The teacher may wish to administer discussion test questions orally. Test items for objectives added by the teacher should be constructed and added to the test.

Test Answers

Test answers are provided for each unit. These may be used by the teacher and/or student for checking student achievement of the objectives.

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SELECTED AUDIOVISUAL MATERIALS

Slide - Cassette Series

Pesticide Use Training (420 slides divided into eight chapters with scripts and narrative cassettes) and Apply Pesticides Correctly: Instructor's Manual (classroom guide for use with slide set), United States Environmental Protection Agency. Distributed by the National Audiovisual Center, Government Services Administration, Washington, DC 20409.

Be a Pro with Pesticides (72 slides, script and narrative cassette), Visual Communications, 412S Roberts Hall, Cornell University, Ithaca, NY 14853, ATTN: George Lavris. This set is to be used in conjunction with the film of the same title listed below. Provision is made for student participation.

Be a Pro: Avoid Pesticide Accidents (79 slides, script and narrative cassette). Visual Communications, 412S Roberts Hall, Cornell University, Ithaca, NY 14853, ATTN: George Lavris. This set follows the assignment sheet "Distinguish Between Safe and Unsafe Pesticide Practices."

Film

Be a Pro with Pesticides (22 1/2 minute 16 mm). Distributed by R. G. Turner, Box 41, Roberts Hall, Cornell University, Ithaca, NY 14853.

Videocassettes

Proper Pesticide Use Series: "Pesticides," (eight chapters) color videocassettes distributed by Oregon State University, Corvallis, Oregon 97331.

Applying Pesticides Properly, (eight chapters) color videocassettes distributed by Kansas State University, Manhattan, Kansas 66506.

(NOTE: Consult your extension agent and other resource personnel for other appropriate audiovisual materials for your geographical location.)

SELECTED REFERENCES

U.S., Department of Agriculture and Environmental Protection Agency. *Apply Pesticides Correctly: A Guide for Commercial Applicators.* Washington, D.C.: Government Printing Office, 1975.

U.S., Department of Agriculture and Environmental Protection Agency. *Apply Pesticides Correctly: A Guide for Private Applicators.* Washington, D.C.: Government Printing Office, 1975.

Dewey, J. E., et al. *Pesticide Applicator Training Manual.* Ithaca, New York: Cornell University, 1974.

We gratefully acknowledge the permission extended to us by the Northeast *Pesticide Applicator Training Manual* for use of selected art work on the transparency masters.

(NOTE: Consult your extension agent and other resource personnel for other appropriate reference manuals and materials for your geographical location.)

INTRODUCTION
UNIT I

TERMINAL OBJECTIVE

After completion of this unit, the student should be able to list problems associated with pesticide usage, match the EPA classifications of pesticides to the correct definitions, and list capabilities of the certified private applicator. This knowledge will be evidenced by scoring eighty-five percent on the unit test.

SPECIFIC OBJECTIVES

After completion of this unit, the student should be able to:

1. Match terms associated with the private pesticide applicator certification program to their correct definitions.
2. List problems associated with pesticide usage.
3. Discuss pesticide registration.
4. Match the EPA classifications of pesticides to the correct definitions.
5. List the capabilities of the certified private applicator.
6. Explain the difference between deposit and residue.
7. Explain how finite tolerances are determined.

INTRODUCTION
UNIT I

SUGGESTED ACTIVITIES

I. Instructor:

  A. Provide student with objective sheet.

  B. Provide student with information sheet.

  C. Make transparency.

  D. Discuss terminal and specific objectives.

  E. Discuss information sheet.

  F. Stress the importance of the correct use of chemicals and the dangers and hazards of improper use.

  (NOTE: The instructor may want to invite a resource person to visit with the class concerning the importance of the private pesticide applicators certification program.)

  G. Give test.

II. Student:

  A. Read objective sheet.

  B. Study information sheet.

  C. Take test.

INSTRUCTIONAL MATERIALS

I. Objective sheet

II. Information sheet

III. Transparency master: TM 1–Negligible Residue vs Tolerance

IV. Test

V. Answers to test

INTRODUCTION
UNIT I

INFORMATION SHEET

I. Terms and definitions

A. Private applicator--Certified applicator who uses or supervises the use of any pesticide classified for restricted use for the purpose of producing any agricultural commodity on the property owned or rented by him or his employer or the property of another person producing any agricultural commodity in trade of personal services

B Pesticide--Chemical or other material that will destroy or control a pest or protect something from a pest

C. Negligible residue--Tolerance which is set on a food or feed crop which contains a very small amount of pesticide at harvest as a result of indirect contact with the chemical

D. Tolerance--Amount of pesticide that can legally and safely remain on any food or feed (plant or animal) that is to be eaten by livestock or humans

E. Finite tolerance--Maximum amount of pesticide which can legally remain on food or feed crop at harvest after the pesticide has been directly applied to the crop

F. Agricultural commodity--Any plant or part thereof, animal, or animal product produced by a person

G. Certification--Recognition by certifying agency that a person is competent and thus authorized to use or supervise the use of restricted use pesticides

H. Environment--Your surroundings, usually water, air, soil, plants, and animals

I. Exposure--Not protected or shielded; contact with pesticide through mouth, lungs, or skin

J. Phytotoxicity--Harmful to plant life; causing injury to plant life

K. Hazard--Risk of danger; chance that injury or harm will come to the applicator, other persons, plants, or animals

L. EPA--United States Environmental Protection Agency

INFORMATION SHEET

II. Problems associated with pesticide usage

   A. Movement off target--Drift, runoff, leaching, erosion, or evaporation

   B. Overuse--Overdosing and too frequent applications

   C. Resistance of some pests to certain pesticides

   D. Phytotoxicity to desirable plants

   E. Buildup of some pesticides in animals or in the food chain (accumulation)

   F. Residues of some pesticides which remain unchanged in the environment for long periods of time (persistence)

III. Pesticide registration

   A. Every pesticide, its label, and each use must be registered before it can be sold

   B. Definition of registration--Approval by the Environmental Protection Agency of a pesticide for uses as stated on its label

IV. EPA classifications of pesticides

(NOTE: EPA will classify each use of each pesticide as either general or restricted.)

   A. General use--Pesticide use which will not cause excessive damage to the environment or endanger the applicator or other persons when applied according to label directions

   (NOTE: No certification requirements are necessary on the part of the applicator.)

   B. Restricted use--Pesticide use which may be a hazard to the environment, the applicator, or other persons even when label directions are followed

   (NOTE: An applicator must be certified in order to buy and use restricted use pesticides.)

V. Capabilities of certified private applicators

(NOTE: Failure to comply with certification may result in penalties or fines of up to $1000 or imprisonment of up to thirty days.)

INFORMATION SHEET

A. Purchase and use general use and restricted use pesticides to produce agricultural commodities on property owned or rented by himself or his employer

B. Supervise the use of general and restricted use pesticides to produce agricultural commodities on property owned or rented by himself or his employer

C. Purchase and use general and restricted use pesticides for use on the property of others with whom he trades services

VI. Deposit and residue

A. Deposit--Pesticide placed on a crop, animal, or surface during application

(NOTE: Sometimes the deposit can be easily seen as with many dusts or wettable powders. Other times it cannot be seen with the naked eye.)

B. Residue--Amount of pesticide that remains on or in a crop or animal or on a surface following application

(NOTE: Some pesticides leave little or no residue. Heat, light, moisture, soil organisms, and other chemical reactions in the environment quickly break them down. Other pesticides are not quickly broken down. They leave a residue on the crop or in the environment for weeks, months, or years.)

VII. How finite tolerances are determined (Transparency 1)

A. Studies on test animals (rats, guinea pigs, mice, and others) are done to determine the acute and chronic toxicity of the chemical

B. Length of time the pesticide remains on the target crop or target animal is measured

(NOTE: The time the pesticide remains active in the environment is also determined.)

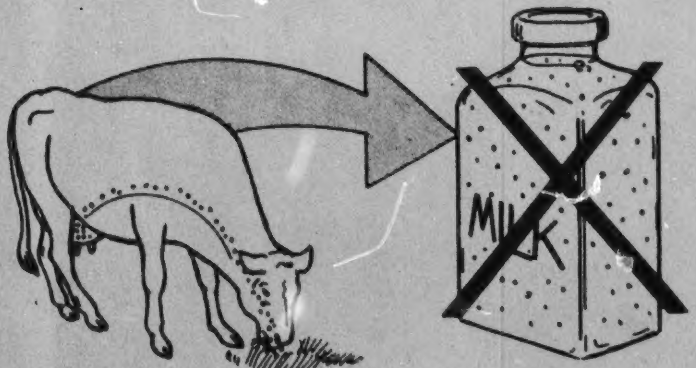
C. Possible long-term injury, such as buildup in man or animals, is studied

D. Tolerance is always set at least 100 times smaller than the highest dose which has no effect on animals

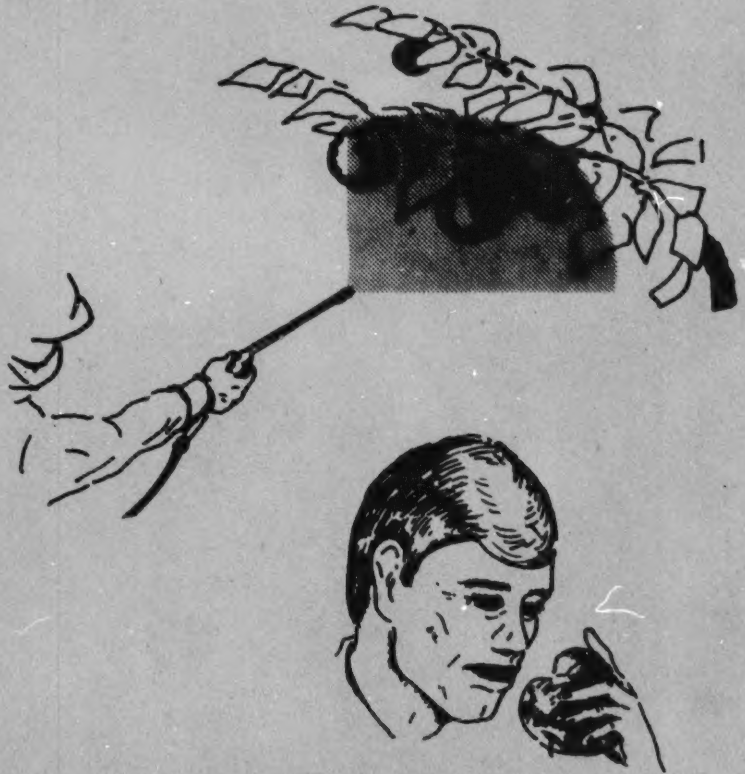
Example: If 200 parts per million of a pesticide have no effect on test animals, then the tolerance for the pesticide on any food or feed crop could be no higher than 2 parts per million (ppm). Negligible residue is always one tenth of a part per million or less.

E. Food or feed which is sold to be eaten must be below the tolerance level

Negligible Residue vs Tolerance



Negligible Residue



Finite Tolerance

INTRODUCTION
UNIT I

TEST

1. Match terms on the right to the correct definitions on the left by placing the appropriate numbers in the blanks provided.

_____a. Maximum amount of pesticide which can legally remain on food or feed crop at harvest after the pesticide has been directly applied to the crop

_____b. Recognition by certifying agency that a person is competent and thus authorized to use or supervise the use of restricted use pesticides

_____c. Not protected or shielded; contact with pesticide through mouth, lungs, or skin

_____d. Risk of danger; chance that injury or harm will come to the applicator, other persons, plants, or animals

_____e. Certified applicator who uses or supervises the use of any pesticide classified for restricted use for the purpose of producing any agricultural commodity on the property owned or rented by him or his employer or the property of another person producing any agricultural commodity in trade of personal services

_____f. Amount of pesticide that can legally and safely remain on any food or feed (plant or animal) that is to be eaten by livestock or humans

_____g. Chemical or other material that will destroy or control a pest or protect something from a pest

_____h. Harmful to plant life; causing injury to plant life

_____i. Your surroundings, usually water, air, soil, plants, and animals

_____j. Any plant or part thereof, animal, or animal product produced by a person

_____k. Tolerance which is set on a food or feed crop which contains a very small amount of pesticide at harvest as a result of indirect contact with the chemical

_____l. United States Environmental Protection Agency

1. Private applicator
2. Pesticide
3. Negligible residue
4. Tolerance
5. Finite tolerance
6. Agricultural commodity
7. Certification
8. Environment
9. Exposure
10. Phytotoxicity
11. Hazard
12. EPA

2. List four problems associated with pesticide usage.

   a.

   b.

   c.

   d.

3. Discuss in a short paragraph pesticide registration.

4. Match the EPA classifications of pesticides on the right to their correct definitions.

______a.	Pesticide use which may be a hazard to the environment, the applicator, or other persons even when label directions are followed	1.	General use
______b.	Pesticide use which will not cause excessive damage to the environment or endanger the applicator or other persons when applied according to label directions	2.	Restricted use

5. List two capabilities of the certified private applicator.

   a.

   b.

6. Explain the difference between deposit and residue.

7. Explain how finite tolerances are determined.

INTRODUCTION
UNIT I

ANSWERS TO TEST

1.
   - a. 5
   - b. 7
   - c. 9
   - d. 11
   - e. 1
   - f. 4
   - g. 2
   - h. 10
   - i. 8
   - j. 6
   - k. 3
   - l. 12
2. Any four of the following:
   - a. Movement off target--Drift, runoff, leaching, erosion, or evaporation
   - b. Overuse--Overdosing and too frequent applications
   - c. Resistance of some pests to certain pesticides
   - d. Phytotoxicity to desirable plants
   - e. Buildup of some pesticides in animals or in the food chain (accumulation)
   - f. Residues of some pesticides which remain unchanged in the environment for long periods of time (persistence)
3. Discussion should include:
   - a. Every pesticide, its label, and each use must be registered before it can be sold
   - b. Definition of registration--Approval by the Environmental Protection Agency of a pesticide for uses as stated on its label
4.
   - a. 2
   - b. 1
5. Any two of the following:
   - a. Purchase and use general use and restricted use pesticides to produce agricultural commodities on property owned or rented by himself or his employer
   - b. Supervise the use of general and restricted use pesticides to produce agricultural commodities on property owned or rented by himself or his employer
   - c. Purchase and use general and restricted use pesticides for use on the property of others with whom he trades services

6. Explanation should include:

   a. Deposit–Pesticide placed on a crop, animal, or surface during application

   b. Residue–Amount of pesticide that remains on or in a crop or animal or on a surface following application

7. Explanation should include:

   a. Studies on [illegible] animals (rats, guinea pigs, mice, and others) are done to determine the acute and chronic toxicity of the chemical

   b. Length of time the pesticide remains on the target crop or target animal is measured

   c. Possible long-term injury, such as buildup in man or animals, is studied

   d. Tolerance is always set at least 100 times smaller than the highest dose which has no effect on animals

   e. Food or feed which is sold to be eaten must be below the tolerance level

PESTS
UNIT II

TERMINAL OBJECTIVE

After completion of this unit, the student should be able to list main groups of pests, ways insects damage crops, and causes and symptoms of plant diseases. The student should be able to identify life cycles of insects, state the difference between grasses and broadleaf plants, name sources for aid in identifying pests, and interpret pesticide labels. This knowledge will be evidenced through demonstration and by scoring eighty-five percent on the unit test.

SPECIFIC OBJECTIVES

After completion of this unit, the student should be able to:

1. Match terms associated with pests to the correct definitions.
2. List main groups of pests.
3. List ways insects may damage crops.
4. List ways insects affect livestock and man.
5. Name identifying characteristics common to all adult insects.
6. Name characteristics which aid in distinguishing one insect from another.
7. Identify the four stage life cycle of insects.
8. Identify the three stage life cycle of insects.
9. Name identifying characteristics of mites, ticks, and spiders.
10. List vertebrate pest animals.
11. State the difference between grasses and broadleaf plants.
12. Classify plants as annuals, biennials, or perennials.
13. List main causes of plant diseases.
14. Classify causes of plant diseases as parasitic or nonparasitic.
15. List symptoms of plant diseases.
16. Describe symptoms of nematode damage.
17. Name sources for aid in identifying pests.
18. Interpret pesticide labels correctly when given questions concerning pests.

PESTS
UNIT II

SUGGESTED ACTIVITIES

I. Instructor:

A. Provide student with objective sheet.

B. Provide student with information and assignment sheets.

C. Make transparencies.

D. Discuss terminal and specific objectives.

E. Discuss information and assignment sheets.

F. Have the student carry out one or all of the following activities:

1. Find out the names of the common insect pests on your farm. Which kind of life cycle do they have? In what stage of development are they a problem? How do they damage your crops or livestock?

2. Find out the names of the common weed pests on your farm or in your area. Are they grasses or broadleaf weeds? Are they annuals, biennials, or perennials?

3. Find out the kinds of plant diseases on your farm or in your area. Are they parasitic or nonparasitic? Find out what is causing them, such as fungus, bacteria, nematodes, drought, or air pollution. What kinds of damage do they cause on your crop?

G. Give test.

II. Student:

A. Read objective sheet.

B. Study information sheet and take notes.

C. Complete assignment sheet.

D. Take test.

INSTRUCTIONAL MATERIALS

I. Objective sheet

II. Information sheet

III. Transparency masters

   A. TM 1--Insect Damage

   B. TM 2--Adult Insects

   C. TM 3--Wings and Mouthparts

   D. TM 4--Four Stage Life Cycle

   E. TM 5--Three Stage Life Cycle

   F. TM 6--Mite, Tick, and Spider

   G. TM 7--Vertebrate Pest Animals

   H. TM 8--Grasses and Broadleaf Plants

   I. TM 9--Annuals, Biennials, and Perennials

   J. TM 10--Parasitic Causes

   K. TM 11--Nematode Damage

   L. TM 12--Symptoms of Diseases

IV. Assignment Sheet #1--Interpret Pesticide Labels

V. Answers to assignment sheet

VI. Test

VII. Answers to test

PESTS
UNIT II

INFORMATION SHEET

I. Terms and definitions

A. Organism--Any living thing

B. Pest--Unwanted organism

C. Vertebrate--Animal with a bony spinal column

D. Insect--Small invertebrate animal with three body regions and six jointed legs; may have two, four, or no wings

E. Mite, tick, and spider--Animals closely related to insects but with two body regions, eight jointed legs, and no wings

F. Plant disease--Harmful condition which affects plant life

G. Nematode--Small worm organism that feeds on or in plants and animals

H. Parasite--Organism that lives and feeds in or on another organism

I. Life cycle--Stages in the life development of organisms

J. Larva--Young insect that does not look like an adult insect

K. Pupa--Insect in the nonfeeding, usually immobile stage

L. Nymph--Young insect that looks similar to an adult insect

M. Fungus--Small plant which causes rot, mold, and plant disease (plural, fungi)

N. Bacterium--One-celled microorganism (plural, bacteria)

O. Sign or symptom--Feeling or signal that something is wrong, such as change in growth habits

P. Annual--Plant that grows from seed, produces seed the same year, and then dies

Q. Perennial--Plant that normally lives for more than two years

R. Biennial--Plant that grows two years, produces seed, and then dies

INFORMATION SHEET

II. Main groups of pests

   A. Insects

   B. Mites, ticks, and spiders

   C. Plant diseases

   D. Nematodes

   E. Vertebrate animals

   F. Weeds

III. Ways insects may damage crops (Transparency 1)

   A. Chew foliage

   B. Tunnel or bore into stems, stalks, and branches

   C. Feed on and tunnel in roots

   D. Suck the sap from leaves

   E. Carry plant disease agents

IV. Ways insects affect livestock and man

   A. Blood sucking

      Examples: Flies and lice

   B. Direct attack and spread of disease organisms

      Examples: Mosquitoes carry malaria; ticks carry Rocky Mountain spotted fever

   C. Living on or in the animal

      Examples: Screwworms and cattle grubs

V. Identifying characteristics common to all adult insects (Transparency 2)

   A. Six jointed legs

   B. Three body regions

      (NOTE: The body consists of the head, abdomen, and thorax.)

INFORMATION SHEET

VI. Characteristics which distinguish one insect from another (Transparency 3)

A. Wings

(NOTE: Some insects have no wings; others have two or four. The wings vary in shape, size, thickness, and structure.)

B. Mouthparts

(NOTE: Insects with chewing mouthparts have toothed jaws that bite and tear the food. Insects with piercing-sucking mouthparts have a long beak which they force into a plant or animal to suck out fluids or blood.)

VII. Four stage life cycle of insects (Transparency 4)

A. Egg

B. Larva

(NOTE: The larva is sometimes called a *worm* or *looper*.)

C. Pupa

D. Adult

VIII. Three stage life cycle of insects (Transparency 5)

A. Egg

B. Nymph

(NOTE: The nymph, which looks like a tiny adult, goes through several stages in its development.)

C. Adult

IX. Identifying characteristics of mites, ticks, and spiders (Transparency 6)

A. Eight jointed legs

B. Two body regions

C. No wings

X. Vertebrate pest animals (Transparency 7)

(NOTE: Many vertebrate animals which normally are harmless and desirable can become pests if they interfere with or move into an area where crops and livestock are being produced.)

INFORMATION SHEET

A. Birds

B. Mammals

Example: Rodents

C. Fish

D. Reptiles

Example: Turtle

E. Amphibians

XI. Difference between grasses and broadleaf plants (Transparency 8)

(NOTE: These plants may be annual, perennial, or biennial.)

A. Grasses have long narrow leaves

B. Broadleaf plants have wide, flat leaves and netted veins

XII. Examples of annuals, biennials, and perennials (Transparency 9)

A. Summer annuals--Crabgrass, foxtail

(NOTE: Summer annuals sprout from seed in spring and die before winter.)

B. Winter annuals--Henbit, annual bluegrass

(NOTE: Winter annuals sprout from seed in the fall and die before summer.)

C. Biennials--Mullein, burdock, carrot

D. Perennials--Johnson grass, dandelions

XIII. Main causes of plant diseases

(NOTE: When you find a plant disease problem, you must determine the cause before choosing a control method. Nonparasitic plant diseases have very similar symptoms to parasitic plant diseases.)

A. Nonparasitic

(NOTE: The disease is caused by nonliving agents or materials and cannot be passed from plant to plant. Usually the causes, such as fertilizer burn or machinery, cannot be controlled by the farmer except possibly by changing pest management practices.)

B. Parasitic

(NOTE: The disease is caused by living organisms and is passed from plant to plant. Usually the farmer can control these by using resistant plants, pesticide chemicals, or other pest management practices.)

INFORMATION SHEET

XIV. Nonparasitic and parasitic causes of plant diseases

- A. Nonparasitic causes
  - 1. Air pollution

    Example: From nearby industrial companies
  - 2. Climate

    Examples: Drought, frost
  - 3. Chemicals

    Example: Fertilizer burn
  - 4. Culture

    Example: Injury by machinery
- B. Parasitic causes
  - 1. Fungi (Transparency 10)

    Examples: Root rots, scabs, smut
  - 2. Bacteria (Transparency 10)

    Example: Leaf spots
  - 3. Viruses

    Example: Mosaics
  - 4. Nematodes (Transparency 11)

    Example: Root knot nematode

XV. Symptoms of plant diseases (Transparency 12)

- A. Decaying or rotting
- B. Abnormal growth

  Examples: Galls, swelling, leaf curls
- C. Underdevelopment or stunting
- D. Wilting
- E. Discoloration

INFORMATION SHEET

XVI. Symptoms of nematode damage (Transparency 11)

A. Similar to plant disease symptoms on plant parts above ground

B. Swollen roots with lesions (scars)

XVII. Sources for aid in identifying pests

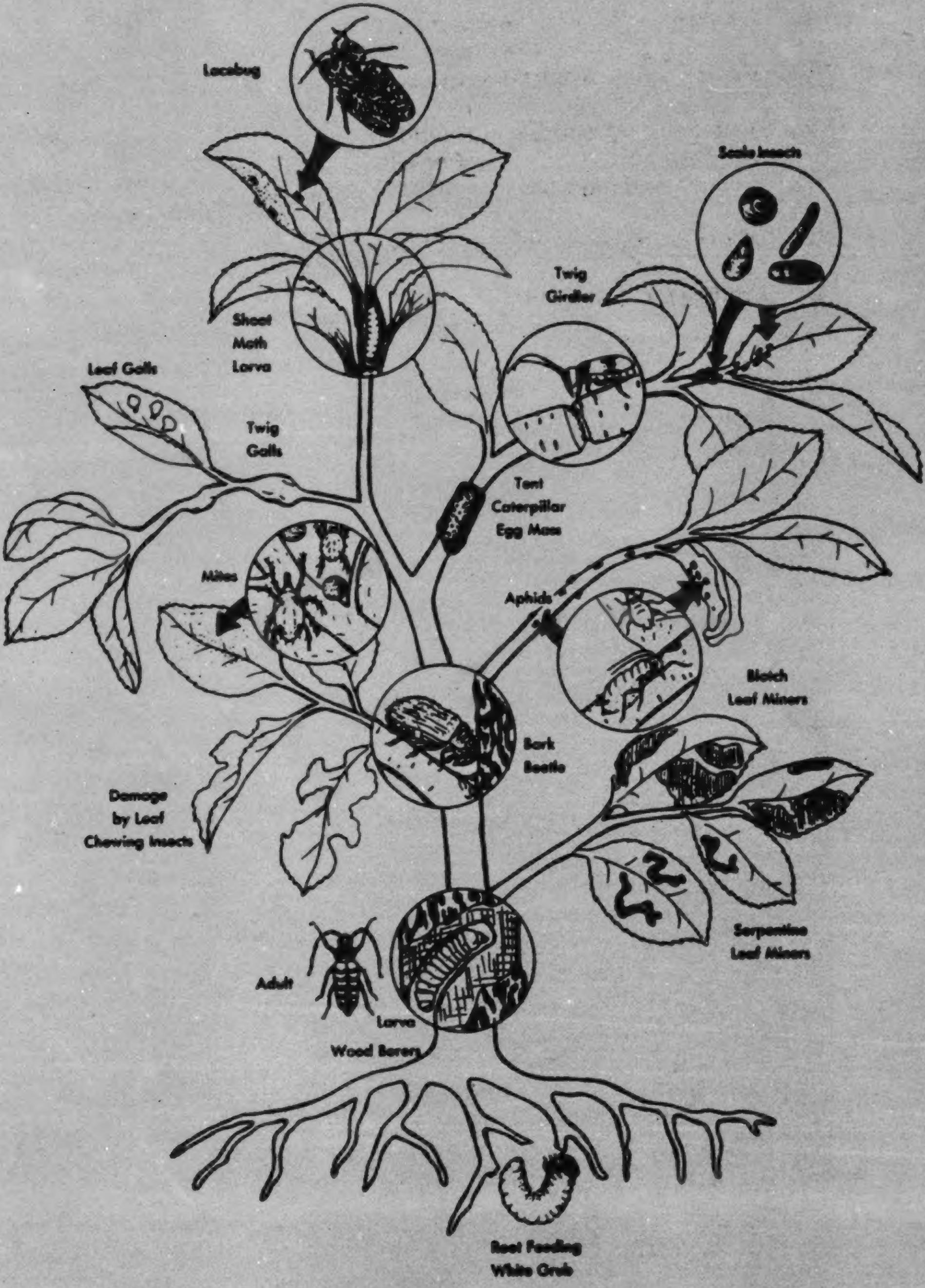
A. Vocational agriculture instructor

B. County extension agent

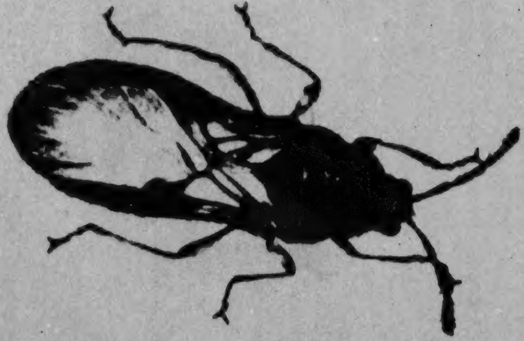
C. Pesticide dealer or representative

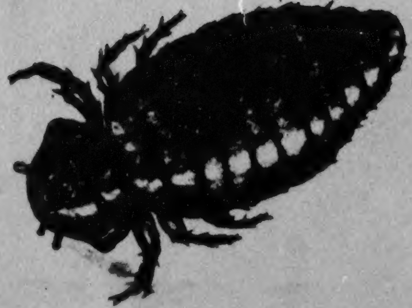
D. Land grant university

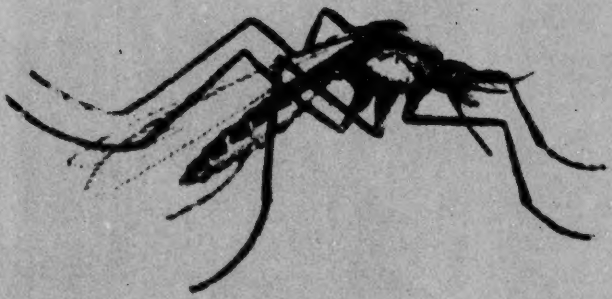
Insect Damage

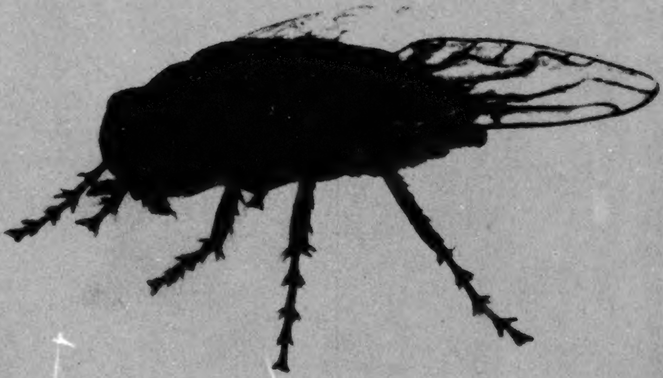

Lacebug
Scale Insects
Twig Girdler
Shoot Moth Larva
Leaf Galls
Twig Galls
Tent Caterpillar Egg Mass
Mites
Aphids
Blotch Leaf Miners
Bark Beetle
Damage by Leaf Chewing Insects
Serpentine Leaf Miners
Adult
Larva
Wood Borers
Root Feeding White Grub

Adult Insects

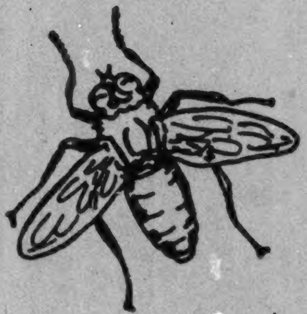




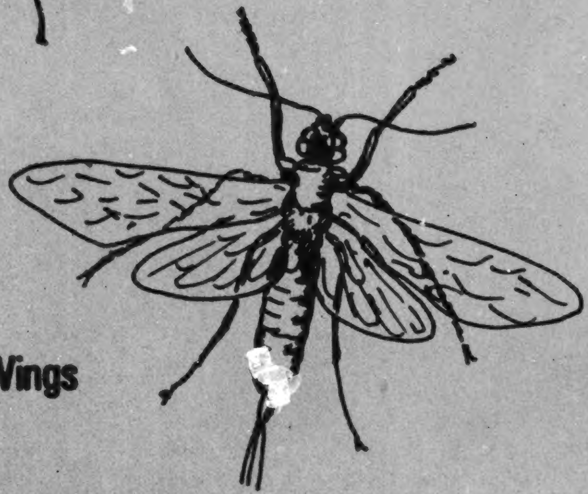




Wings and Mouthparts

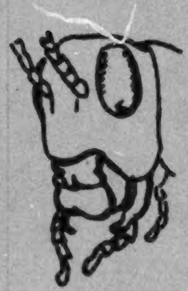


Two Wings

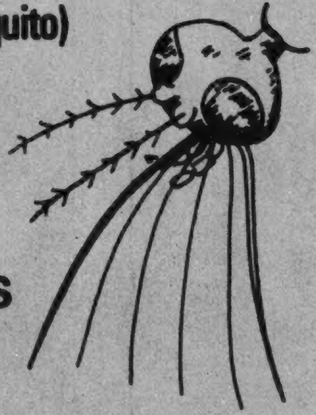


Four Wings

Wings



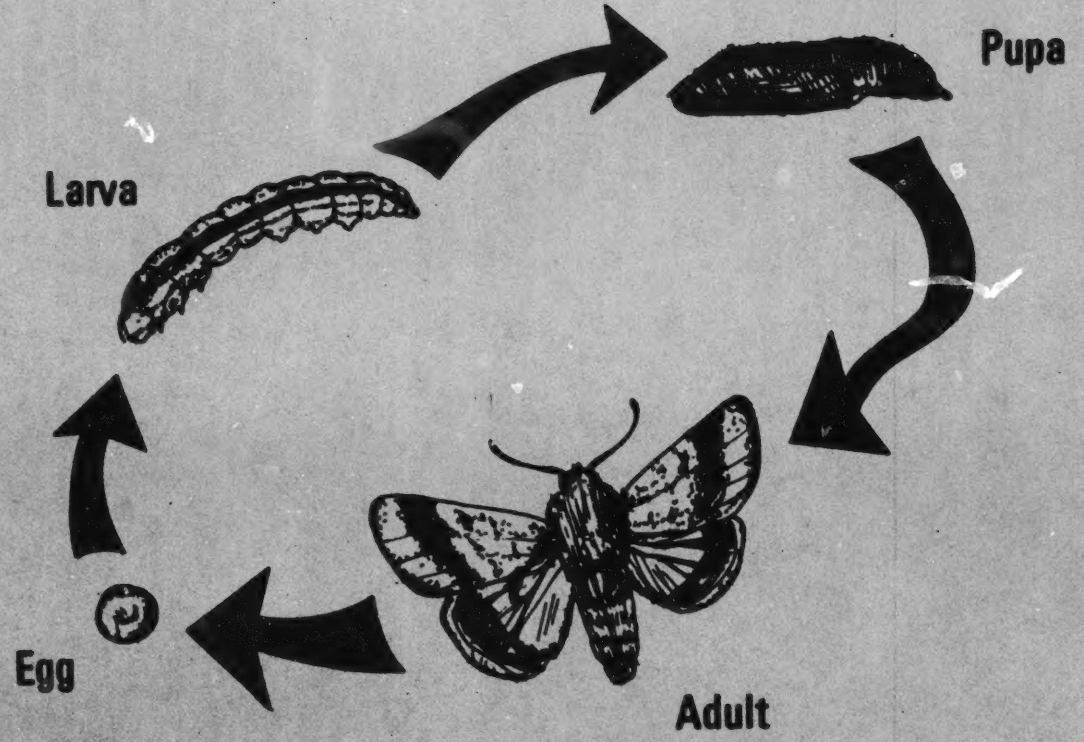
Chewing
(Grasshopper)



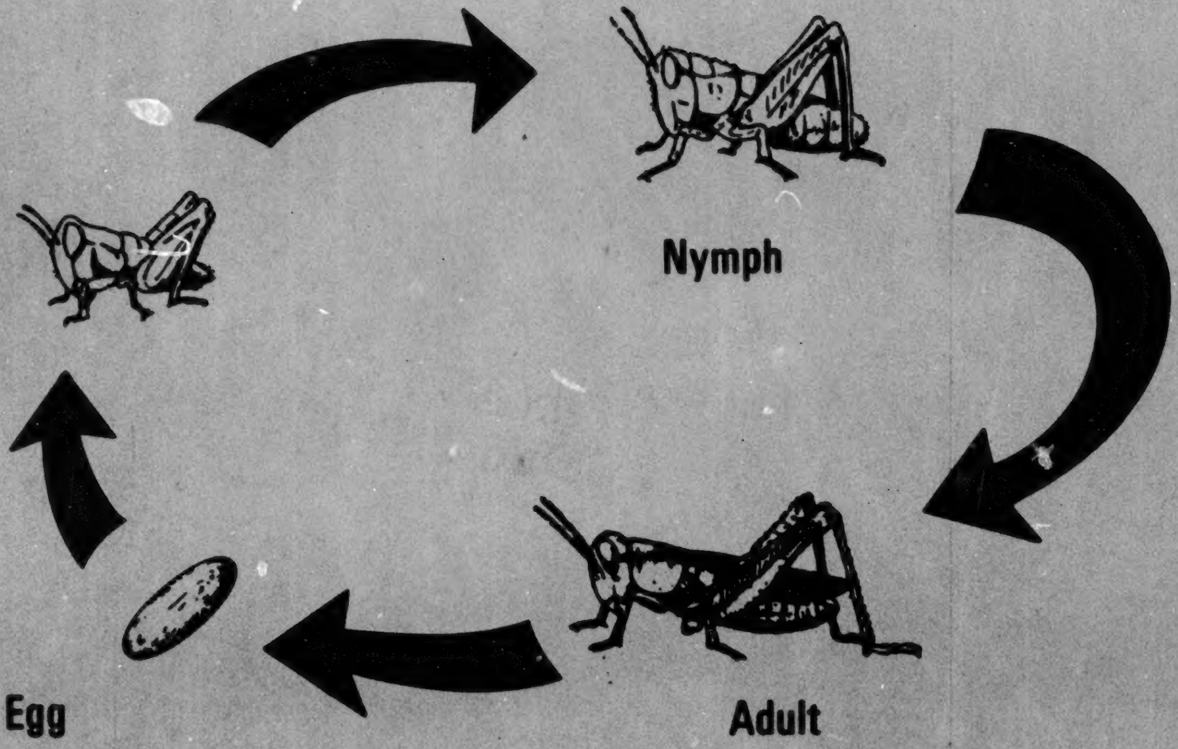
Sucking
(Mosquito)

Mouthparts

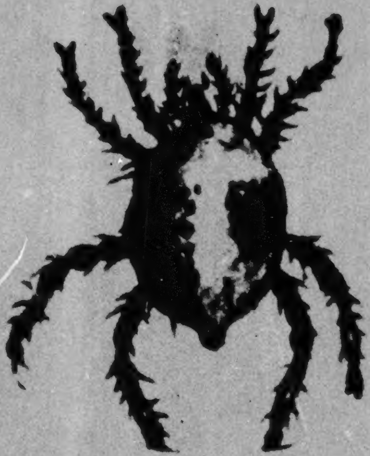
Four Stage Life Cycle


Pupa
Larva
Egg
Adult

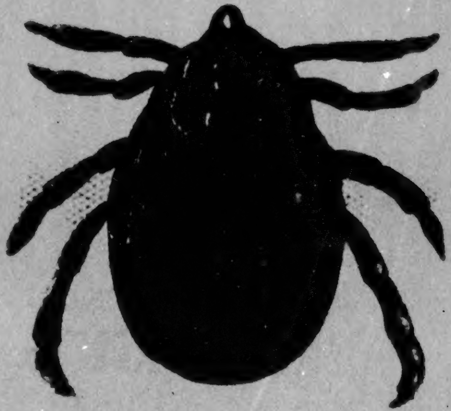
Three Stage Life Cycle


Nymph
Adult
Egg

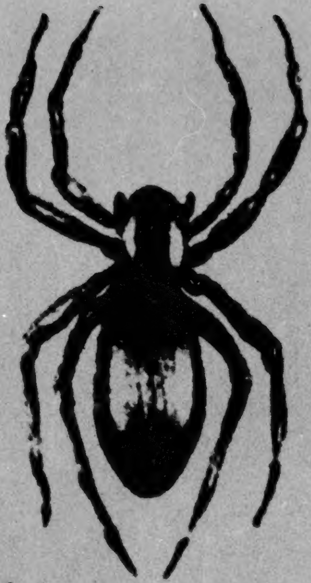
Mite, Tick, and Spider



Mite

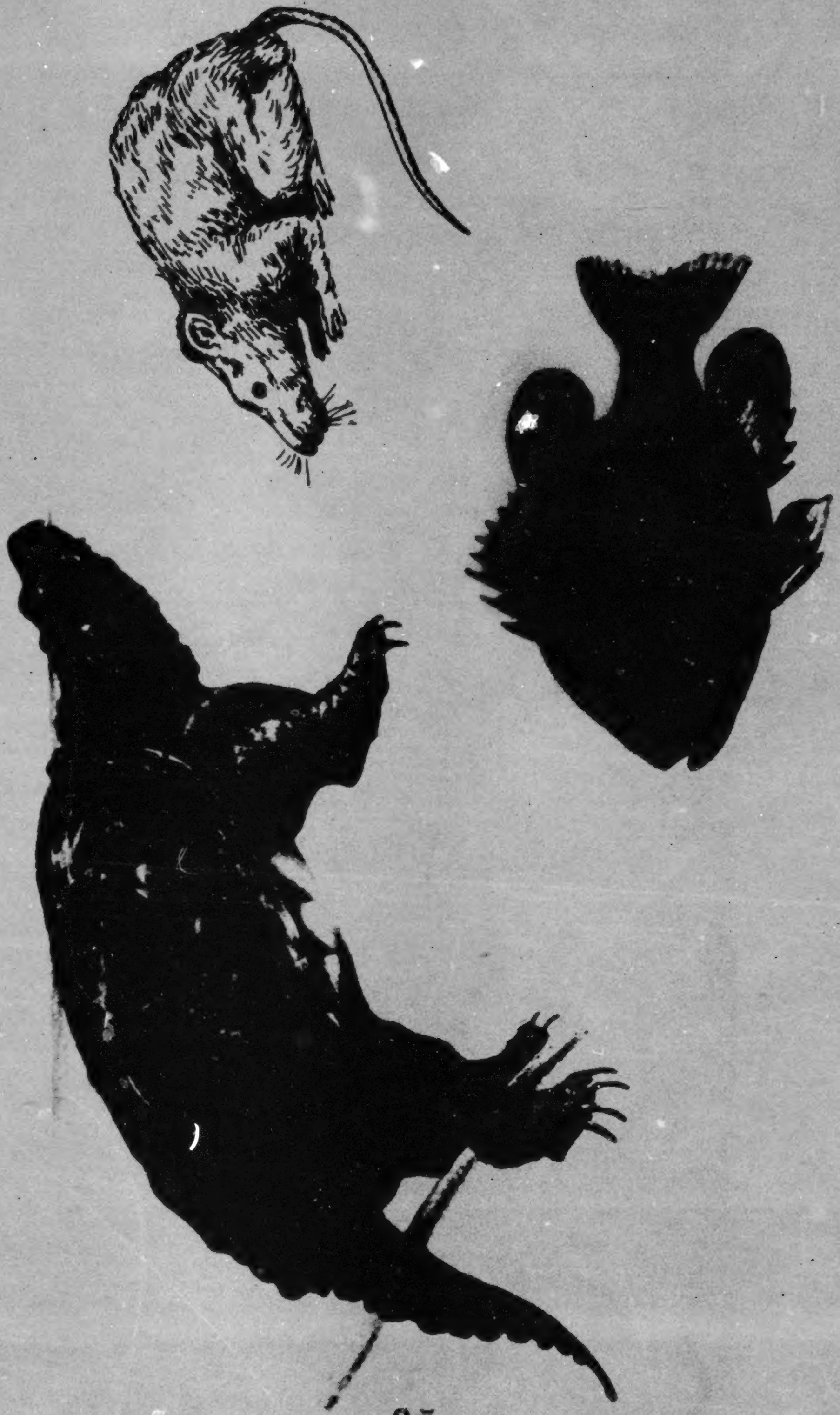


Tick

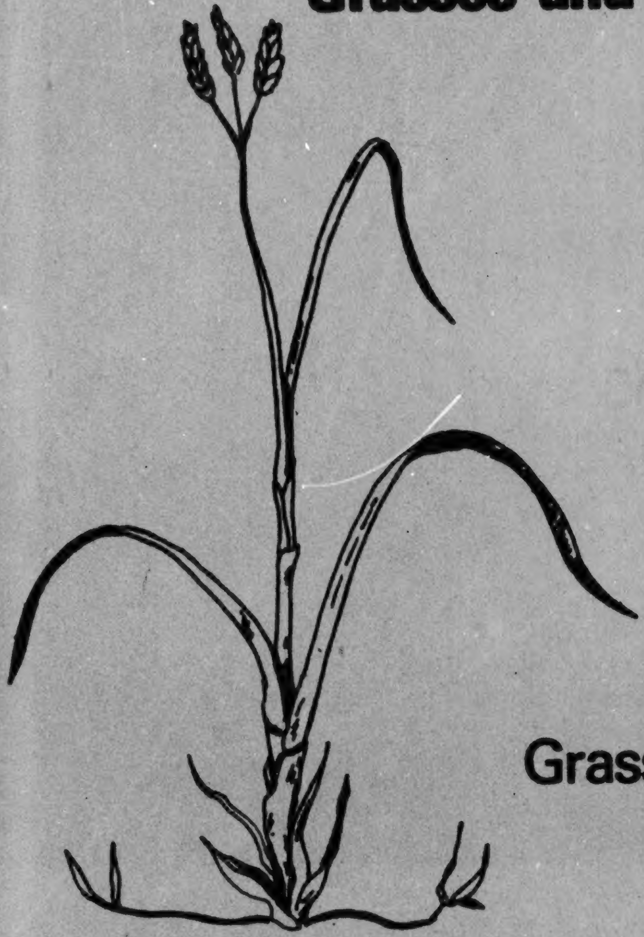


Spider

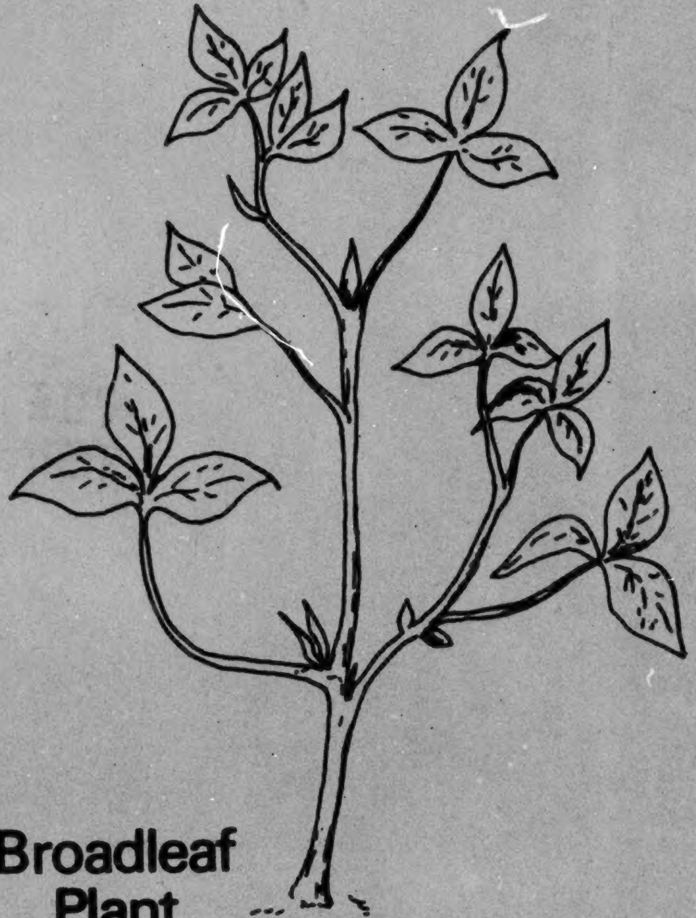
Vertebrate Pest Animals



Grasses and Broadleaf Plants

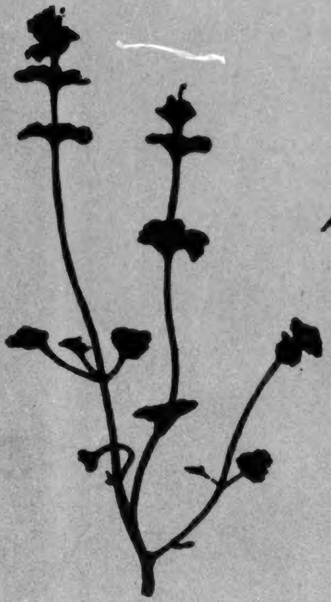


Grass

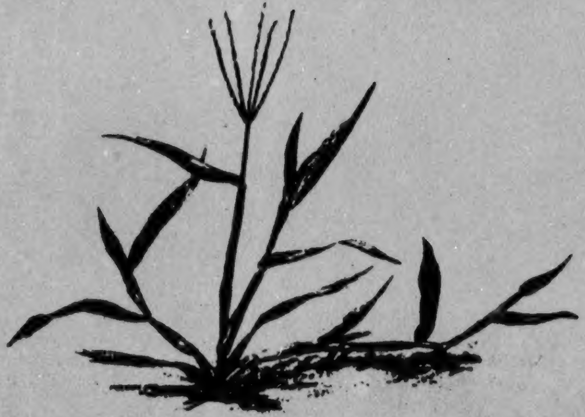


Broadleaf Plant

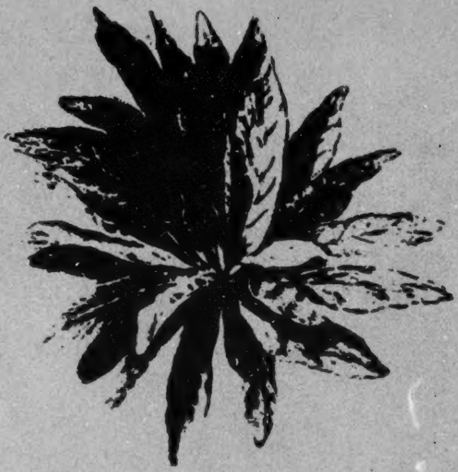
Annuals, Biennials, and Perennials



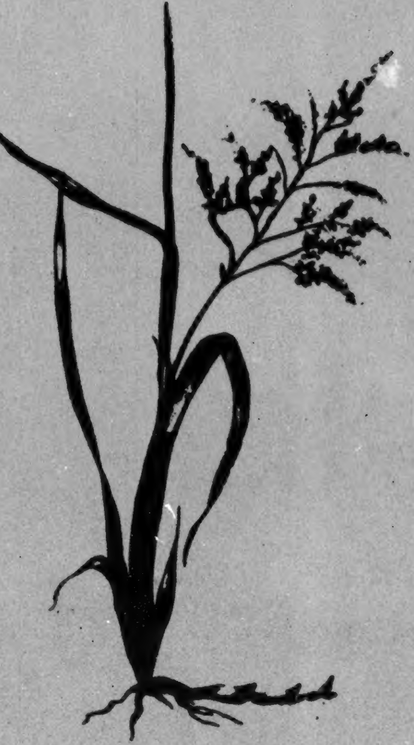
Winter Annual
(Henbit)



Summer Annual
(Crabgrass)



Biennial
(Mullein)

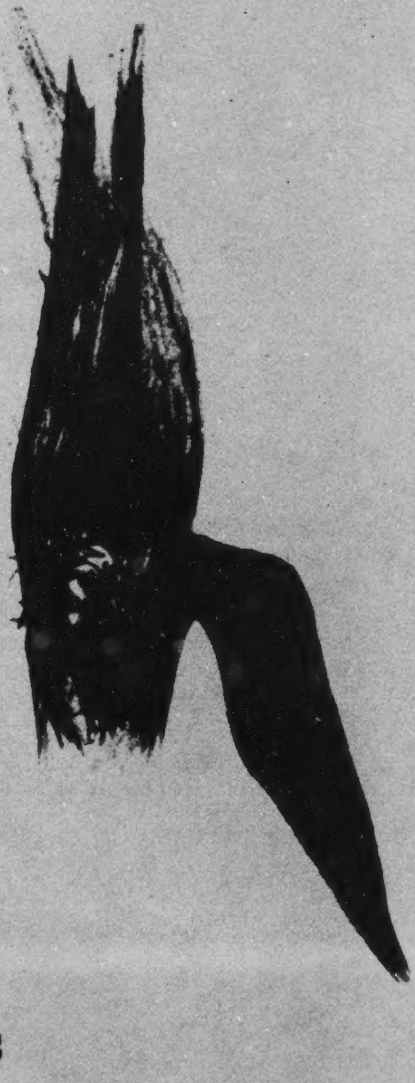


Perennial
(Johnson Grass)

Parasitic Causes

Bacteria

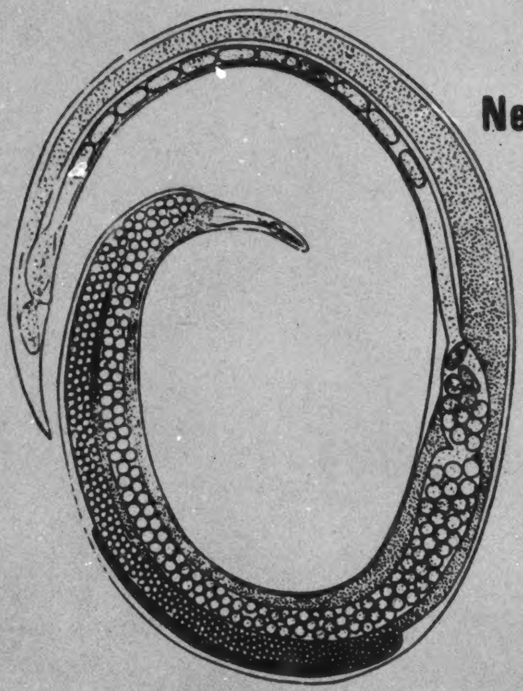
(Leaf Spot)



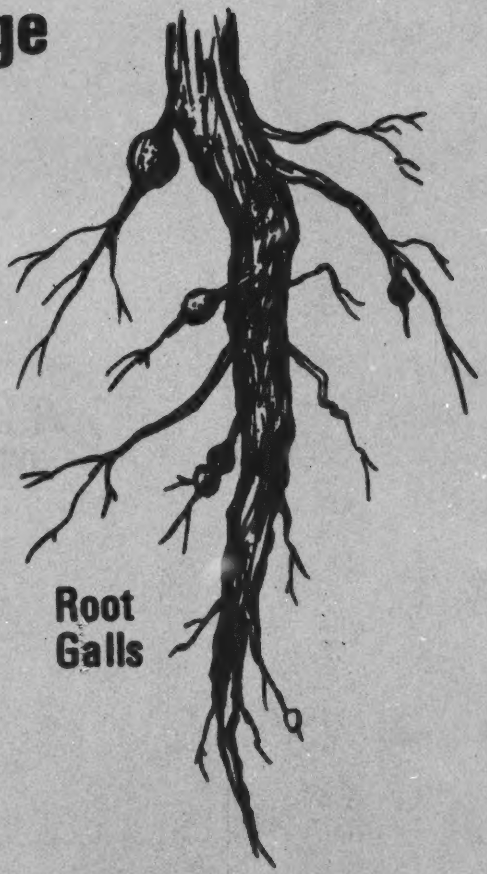
Fungi

(Smut)

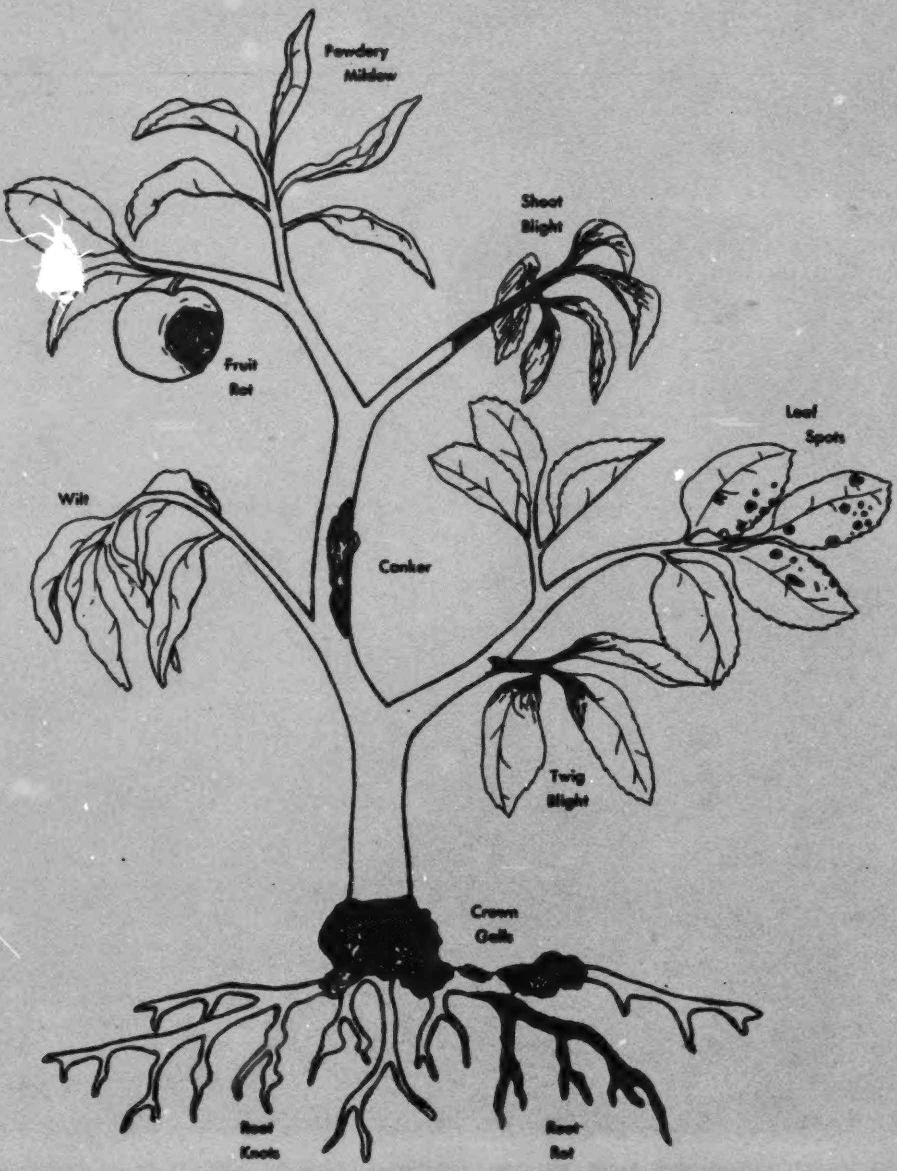
Nematode Damage



Actual Length Equals 1/50 to 1/25 Inch



Symptoms of Diseases


Powdery Mildew
Shoot Blight
Fruit Rot
Leaf Spots
Wilt
Canker
Twig Blight
Crown Galls
Root Knots
Root Rot

PESTS
UNIT II

ASSIGNMENT SHEET #1–INTERPRET PESTICIDE LABELS

Read the labels provided on the following pages and answer the questions below.

1. Using the De Metho label, answer the following questions.

   a. What type of pests does this pesticide control?

   b. When the label refers to *worms* or *loopers*, to what stage of the insect's life cycle is it referring?

2. Using the No-Disease label, answer the following questions.

   a. What type of pests does this pesticide control?

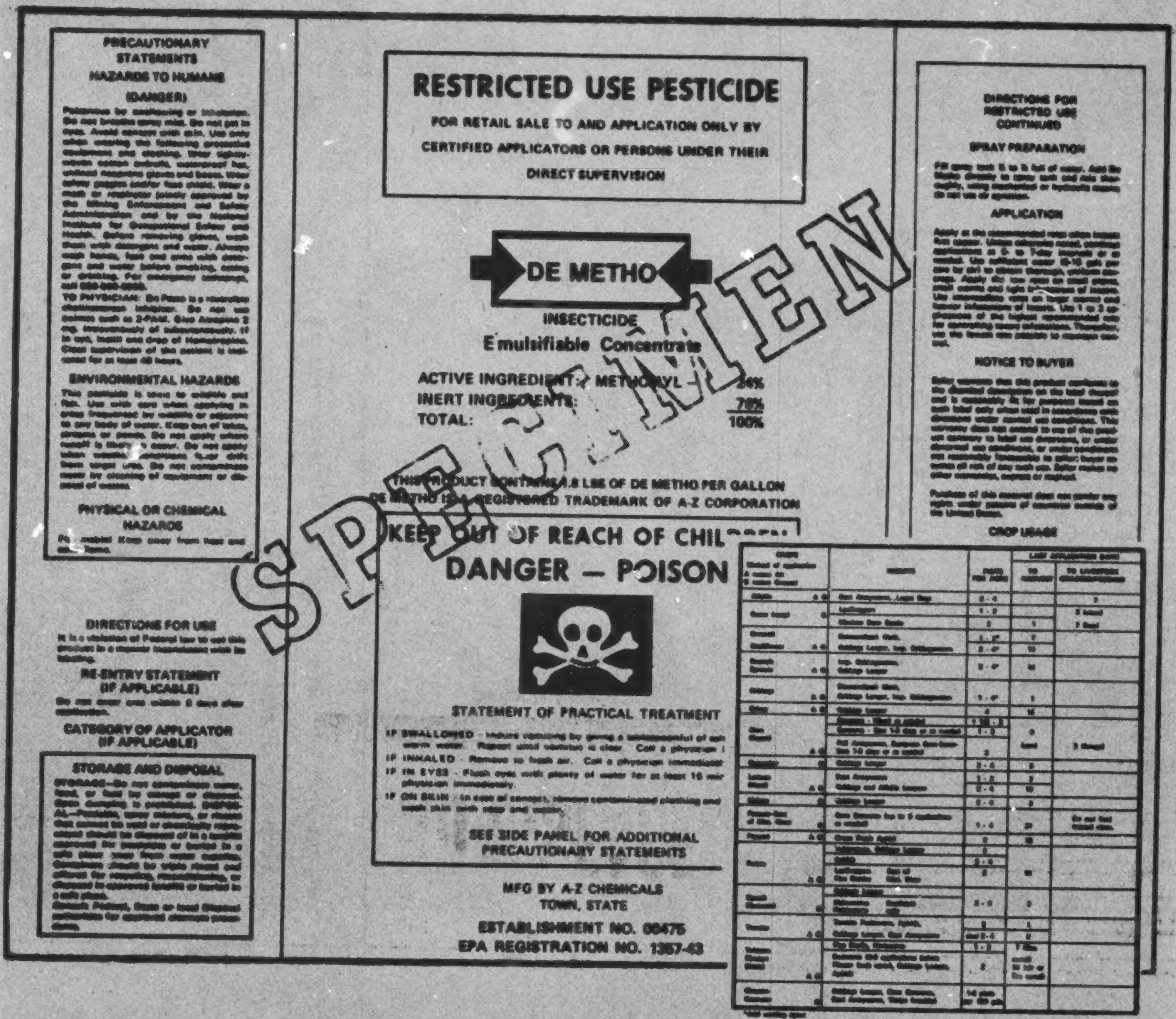
   b. Are the diseases which this pesticide controls parasitic or nonparasitic?

3. Using the Anti-Weed label, answer the following questions.

   a. What type of pests does this pesticide control?

   b. Is it used to control grasses or broadleaf weeds?

   c. Does it control annuals, biennials, or perennials when used on corn?



PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS (DANGER)

[illegible]

ENVIRONMENTAL HAZARDS

[illegible]

PHYSICAL OR CHEMICAL HAZARDS

[illegible]

DIRECTIONS FOR USE

[illegible]

RE-ENTRY STATEMENT (IF APPLICABLE)

[illegible]

CATEGORY OF APPLICATOR (IF APPLICABLE)

STORAGE AND DISPOSAL

[illegible]

RESTRICTED USE PESTICIDE

FOR RETAIL SALE TO AND APPLICATION ONLY BY CERTIFIED APPLICATORS OR PERSONS UNDER THEIR DIRECT SUPERVISION

DE METHO

INSECTICIDE

Emulsifiable Concentrate

ACTIVE INGREDIENT: METHOMYL	24%
INERT INGREDIENTS:	76%
TOTAL:	100%

THIS PRODUCT CONTAINS 1.8 LBS OF DE METHO PER GALLON

DE METHO IS A REGISTERED TRADEMARK OF A-Z CORPORATION

KEEP OUT OF REACH OF CHIL

DANGER — POISON

STATEMENT OF PRACTICAL TREATMENT

IF SWALLOWED - [illegible]

IF INHALED - [illegible]

IF IN EYES - [illegible]

IF ON SKIN - [illegible]

SEE SIDE PANEL FOR ADDITIONAL PRECAUTIONARY STATEMENTS

MFG BY A-Z CHEMICALS
TOWN, STATE

ESTABLISHMENT NO. 00475
EPA REGISTRATION NO. 1357-43

DIRECTIONS FOR RESTRICTED USE CONTINUED

SPRAY PREPARATION

[illegible]

APPLICATION

[illegible]

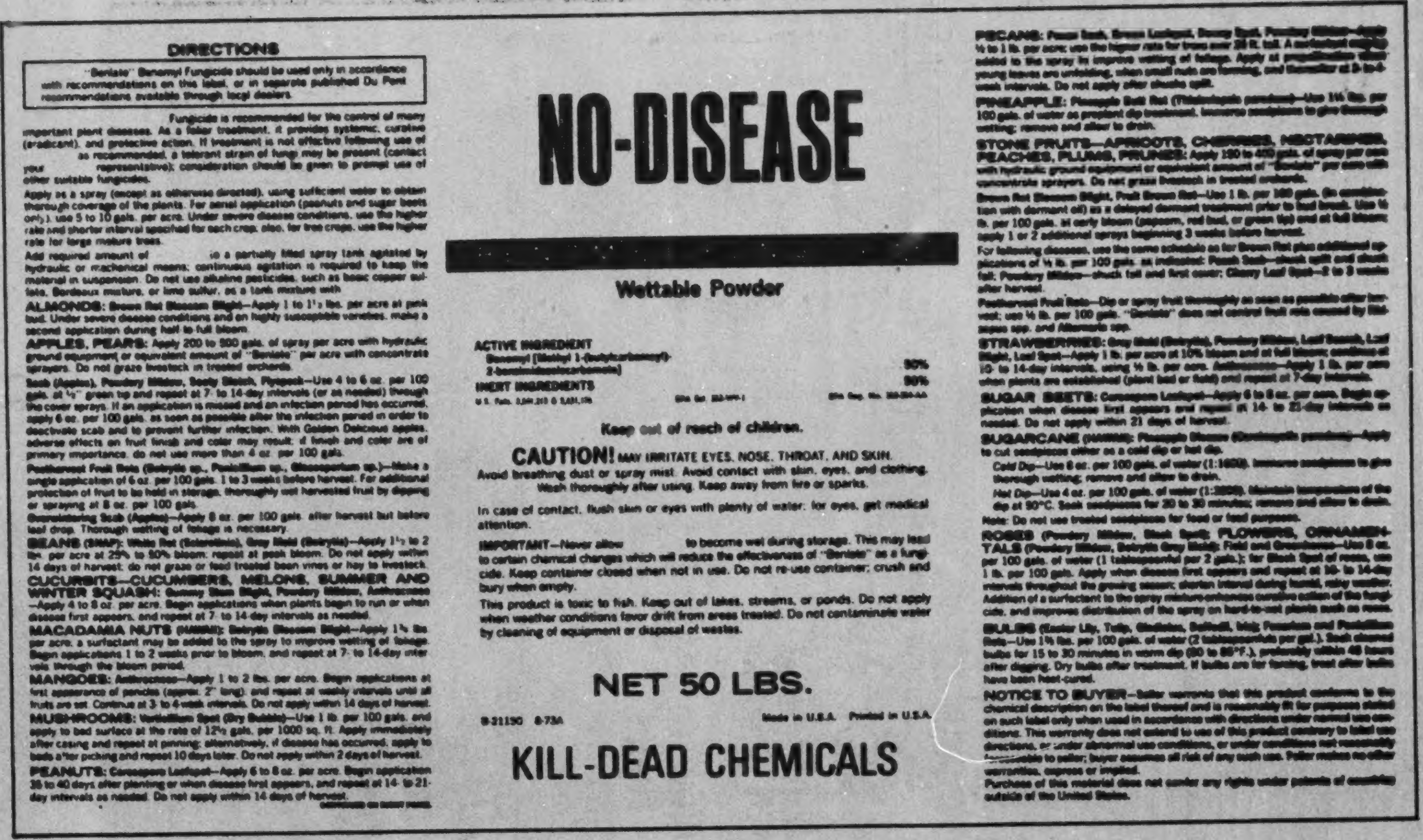
NOTICE TO BUYER

[illegible]

CROP USAGE

[illegible]

ASSIGNMENT SHEET #1



DIRECTIONS

"Benlate" Benomyl Fungicide should be used only in accordance with recommendations on this label, or in separate published Du Pont recommendations available through local dealers.

Fungicide is recommended for the control of many important plant diseases. As a foliar treatment, it provides systemic, curative (eradicant), and protective action. If treatment is not effective following use of as recommended, a tolerant strain of fungi may be present (contact your representative); consideration should be given to prompt use of other suitable fungicides.

Apply as a spray (except as otherwise directed), using sufficient water to obtain thorough coverage of the plants. For aerial application (peanuts and sugar beets only), use 5 to 10 gals. per acre. Under severe disease conditions, use the higher rate and shorter interval specified for each crop; also, for tree crops, use the higher rate for large mature trees.

Add required amount of to a partially filled spray tank agitated by hydraulic or mechanical means; continuous agitation is required to keep the material in suspension. Do not use alkaline pesticides, such as basic copper sulfate, Bordeaux mixture, or lime sulfur, as a tank mixture with

ALMONDS: Brown Rot Blossom Blight—Apply 1 to 1½ lbs. per acre at pink bud. Under severe disease conditions and on highly susceptible varieties, make a second application during half to full bloom.

APPLES, PEARS: Apply 200 to 500 gals. of spray per acre with hydraulic ground equipment or equivalent amount of "Benlate" per acre with concentrate sprayers. Do not graze livestock in treated orchards.

Scab (Apples), Powdery Mildew, Sooty Blotch, Flyspeck—Use 4 to 6 oz. per 100 gals. at ½" green tip and repeat at 7- to 14-day intervals (or as needed) through the cover sprays. If an application is missed and an infection period has occurred, apply 6 oz. per 100 gals. as soon as possible after the infection period in order to deactivate scab and to prevent further infection. With Golden Delicious apples, adverse effects on fruit finish and color may result; if finish and color are of primary importance, do not use more than 4 oz. per 100 gals.

Postharvest Fruit Rots (Botrytis sp., Penicillium sp., Gloeosporium sp.)—Make a single application of 6 oz. per 100 gals. 1 to 3 weeks before harvest. For additional protection of fruit to be held in storage, thoroughly wet harvested fruit by dipping or spraying at 8 oz. per 100 gals.

Overwintering Scab (Apples)—Apply 8 oz. per 100 gals. after harvest but before leaf drop. Thorough wetting of foliage is necessary.

BEANS (SNAP): White Rot (Sclerotinia), Gray Mold (Botrytis)—Apply 1½ to 2 lbs. per acre at 25% to 50% bloom; repeat at peak bloom. Do not apply within 14 days of harvest; do not graze or feed treated bean vines or hay to livestock.

CUCURBITS—CUCUMBERS, MELONS, SUMMER AND WINTER SQUASH: Gummy Stem Blight, Powdery Mildew, Anthracnose—Apply 4 to 8 oz. per acre. Begin applications when plants begin to run or when disease first appears, and repeat at 7- to 14-day intervals as needed.

MACADAMIA NUTS (HAWAII): Botrytis Blossom Blight—Apply 1½ lbs. per acre; a surfactant may be added to the spray to improve wetting of foliage. Begin applications 1 to 2 weeks prior to bloom, and repeat at 7- to 14-day intervals through the bloom period.

MANGOES: Anthracnose—Apply 1 to 2 lbs. per acre. Begin applications at first appearance of panicles (approx. 2" long), and repeat at weekly intervals until all fruits are set. Continue at 3- to 4-week intervals. Do not apply within 14 days of harvest.

MUSHROOMS: Verticillium Spot (Dry Bubble)—Use 1 lb. per 100 gals. and apply to bed surface at the rate of 12½ gals. per 1000 sq. ft. Apply immediately after casing and repeat at pinning; alternatively, if disease has occurred, apply to beds after picking and repeat 10 days later. Do not apply within 2 days of harvest.

PEANUTS: Cercospora Leafspot—Apply 6 to 8 oz. per acre. Begin application 35 to 40 days after planting or when disease first appears, and repeat at 14- to 21-day intervals as needed. Do not apply within 14 days of harvest.

[illegible]

NO-DISEASE

[redacted]

Wettable Powder

ACTIVE INGREDIENT
Benomyl [Methyl 1-(butylcarbamoyl)-2-benzimidazolecarbamate] 50%
INERT INGREDIENTS 50%
U.S. Pats. [illegible] EPA Est. [illegible] EPA Reg. No. [illegible]

Keep out of reach of children.

CAUTION! MAY IRRITATE EYES, NOSE, THROAT, AND SKIN. Avoid breathing dust or spray mist. Avoid contact with skin, eyes, and clothing. Wash thoroughly after using. Keep away from fire or sparks.

In case of contact, flush skin or eyes with plenty of water; for eyes, get medical attention.

IMPORTANT—Never allow to become wet during storage. This may lead to certain chemical changes which will reduce the effectiveness of "Benlate" as a fungicide. Keep container closed when not in use. Do not re-use container; crush and bury when empty.

This product is toxic to fish. Keep out of lakes, streams, or ponds. Do not apply when weather conditions favor drift from areas treated. Do not contaminate water by cleaning of equipment or disposal of wastes.

NET 50 LBS.

B-21150 8-73A Made in U.S.A. Printed in U.S.A.

KILL-DEAD CHEMICALS

PECANS: Pecan Scab, Brown Leafspot, Downy Spot, Powdery Mildew—Apply ½ to 1 lb. per acre; use the higher rate for trees over 25 ft. tall. A surfactant may be added to the spray to improve wetting of foliage. Apply at prepollination when young leaves are unfolding, when small nuts are forming, and thereafter at 3- to 4-week intervals. Do not apply after shucks split.

PINEAPPLE: Pineapple Butt Rot (Thielaviopsis paradoxa)—Use 1½ lbs. per 100 gals. of water as preplant dip treatment. Immerse seedpieces to give thorough wetting; remove and allow to drain.

STONE FRUITS—APRICOTS, CHERRIES, NECTARINES, PEACHES, PLUMS, PRUNES: Apply 100 to 400 gals. of spray per acre with hydraulic ground equipment or equivalent amount of "Benlate" per acre with concentrate sprayers. Do not graze livestock in treated orchards.

Brown Rot Blossom Blight, Fruit Brown Rot—Use 1 lb. per 100 gals. (in combination with dormant oil) as a delayed dormant treatment prior to bud break. Use ½ lb. per 100 gals. at early bloom (popcorn, red bud, or green tip) and at full bloom; apply 1 or 2 additional sprays beginning 3 weeks before harvest.

For following diseases, use the same schedule as for Brown Rot plus additional applications of ½ lb. per 100 gals. as indicated: Peach Scab—shuck split and shuck fall; Powdery Mildew—shuck fall and first cover; Cherry Leaf Spot—2 to 3 weeks after harvest.

Postharvest Fruit Rots—Dip or spray fruit thoroughly as soon as possible after harvest; use ½ lb. per 100 gals. "Benlate" does not control fruit rots caused by Rhizopus spp. and Alternaria spp.

STRAWBERRIES: Gray Mold (Botrytis), Powdery Mildew, Leaf Scorch, Leaf Blight, Leaf Spot—Apply 1 lb. per acre at 10% bloom and at full bloom; continue at 10- to 14-day intervals, using ½ lb. per acre. Anthracnose—Apply 1 lb. per acre when plants are established (plant bed or field) and repeat at 7-day intervals.

SUGAR BEETS: Cercospora Leafspot—Apply 6 to 8 oz. per acre. Begin application when disease first appears and repeat at 14- to 21-day intervals as needed. Do not apply within 21 days of harvest.

SUGARCANE (HAWAII): Pineapple Disease (Ceratocystis paradoxa)—Apply to cut seedpieces either as a cold dip or hot dip.

Cold Dip—Use 8 oz. per 100 gals. of water (1:1600). Immerse seedpieces to give thorough wetting; remove and allow to drain.

Hot Dip—Use 4 oz. per 100 gals. of water (1:3200). Maintain temperature of the dip at 50°C. Soak seedpieces for 20 to 30 minutes; remove and allow to drain.

Note: Do not use treated seedpieces for food or feed purposes.

ROSES (Powdery Mildew, Black Spot), **FLOWERS, ORNAMENTALS** (Powdery Mildew, Botrytis Gray Mold): Field and Greenhouse—Use 8 oz. per 100 gals. of water (1 tablespoonful per 2 gals.); for Black Spot of roses, use 1 lb. per 100 gals. Apply when disease first appears and repeat at 10- to 14-day intervals throughout the growing season; shorten interval during humid, rainy weather. Addition of a surfactant to the spray mixture enhances curative action of the fungicide, and improves distribution of the spray on hard-to-wet plants such as roses.

BULBS (Easter Lily, Tulip, Gladiolus, Daffodil, Iris): Fusarium and Penicillium Rots—Use 1½ lbs. per 100 gals. of water (2 tablespoonfuls per gal.). Soak cleaned bulbs for 15 to 30 minutes in warm dip (80 to 85°F.), preferably within 48 hours after digging. Dry bulbs after treatment. If bulbs are for forcing, treat after bulbs have been heat-cured.

NOTICE TO BUYER—Seller warrants that this product conforms to the chemical description on the label thereof and is reasonably fit for purposes stated on such label only when used in accordance with directions under normal use conditions. This warranty does not extend to use of this product contrary to label use directions, or under abnormal use conditions, or under conditions not reasonably foreseeable to seller; buyer assumes all risk of any such use. Seller makes no other warranties, express or implied.

Purchase of this material does not confer any rights under patents of countries outside of the United States.

ASSIGNMENT SHEET #1

Anti-Weed

20G

SAMPLE LABEL

Herbicide

FOR WEED CONTROL IN CORN

Active Ingredients:	20.0%
Atrazine: 2-chloro-4-Ethylamino-6-isopropylamino-s-triazine . . .	6.32%
Related compounds . .	.34%
2-chloro-N-isopropyl-acetanilide . .	13.34%
Inert Ingredients:	80.0%
Total:	100.0%

Anti-Weed 20G is a granular herbicide

Warning:

Keep out of reach of children. See additional warning statements on back of bag.

50 Pounds

NET WEIGHT

EPA Reg. No. 1000-519

KILL-DEAD

Chemical Company

ASSIGNMENT SHEET #1

DIRECTIONS FOR USE AND CONDITIONS OF SALE AND WARRANTY

IMPORTANT: Read the entire Directions For Use and the Conditions Of Sale And Warranty before using this product.

Conditions Of Sale And Warranty

The **Directions For Use** of this product reflect the opinion of experts based on field use and tests. The directions are believed to be reliable and should be followed carefully. However, it is impossible to eliminate all risks inherently associated with use of this product. Crop injury, ineffectiveness or other unintended consequences may result because of such factors as weather conditions, presence of other materials or the manner of use or application all of which are beyond the control of or the Seller. All such risks shall be assumed by the Buyer.

warrants that this product conforms to the chemical description on the label and is reasonably fit for the purposes referred to in the **Directions For Use**, subject to the inherent risks referred to above. **makes no other express or implied warranty of Fitness or Merchantability or any other express or implied warranty.** In no case shall or the Seller be liable for consequential, special or indirect damages resulting from the use or handling of this product. and the Seller offer this product and the Buyer and user accept it, subject to the foregoing **Conditions Of Sale And Warranty** which may be varied only by agreement in writing signed by a duly authorized representative of

General Information

Anti-Weed will control most annual broadleaf and grass weeds in field corn, silage corn and sweet corn. It should be applied prior to weed and crop emergence.

Since Anti-Weed acts mainly through root absorption, its effectiveness depends on rainfall or irrigation to move it into the root zone. Best results are obtained when moisture occurs within 10 days after application. Should moisture not occur within this period or should weeds develop, a shallow cultivation or rotary hoeing will generally result in better weed control.

Anti-Weed is noncorrosive to equipment and metal surfaces, nonflammable and has low electrical conductivity.

Care should be taken to avoid using Anti-Weed where adjacent desirable trees, shrubs or plants might be injured.

Store Anti-Weed in a dry place.

Application Instructions

Broadcast or Overall Treatment

Use broadcast applicators or fertilizer spreaders that can apply small amounts of granules evenly.

Band Treatment

Use applicators designed for this purpose. Calculate the amount of granules per acre needed for band treatment as follows:

$$\frac{\text{Band Width in Inches}}{\text{Inches Between Crop Rows}} \times \text{Recommended Broadcast Rate} = \text{lbs./Acre Anti-Weed for Band Treatment}$$

Range of Rates: In each case where a range of rates is given, the lower rate should be used on soils low in organic matter and the higher rate should be used on soils high in organic matter.

Directions for Use

Anti-Weed controls most annual broadleaf and grass weeds such as:

Giant Foxtail
Green Foxtail
Yellow Foxtail
Barnyardgrass
  (Watergrass)
Crabgrass

Fall Panicum
Annual Morningglory
Cocklebur
Sandbur
Jimsonweed
Lambsquarters

Mustard
Pigweed
Ragweed
Smartweed
Sunflower
Velvetleaf

Anti-Weed will not control perennial weeds such as:

Johnsongrass Field Bindweed Canada Thistle Bull Nettle

Apply Anti-Weed at planting behind the press wheel or immediately after planting prior to emergence of either crop or weeds. See table below for recommended rates.

Soil	Rate per acre of Anti-Weed Broadcast
Light soils: Sands, loamy sands, and sandy loams	15 lbs.
Medium to heavy soils including the dark prairie soils in the Corn Belt**	22.5– 30 lbs.

*For calculation of band treatment rate, see Application Instructions Section.

** Anti-Weed should not be used on high organic soils such as peat and muck.

Suggestions for Crop Rotations

1) Corn may be replanted at any time following application of Anti-Weed . 2) Sorghum may be seeded in all areas the spring following application of the granules. 3) Soybeans may be seeded in Louisiana, Arkansas, Missouri, Iowa and Southeastern Minnesota and areas east of these states the spring following applications made not later than June 1 of the previous year.

Precautions: 1) Do not plant sugar beets, tobacco, vegetables (including dry beans), spring-seeded small grains or small-seeded legumes and grasses the year following Anti-Weed application or injury may occur. 2) Following harvest of a treated crop, plow (moldboard or disk-plow) and thoroughly till the soil in the fall or spring to minimize possible injury to rotational spring-seeded crops. 3) Injury to rotational crops following application may occur on eroded hillsides, alkali outcroppings, gravelly areas and on soils in general with pH near or exceeding 7.5. 4) Do not graze treated area or feed treated forage to livestock for 21 days following application.

Warning

Keep out of reach of children.

Irritating to skin, eyes, nose and throat. May be harmful if swallowed. May cause allergic skin reaction. Do not get in eyes, on skin or on clothing. Avoid breathing dust. Do not take internally. While handling, wear rubber gloves. In case of contact, flush skin or eyes with plenty of water; for eyes, get medical attention. Launder clothing before reuse. Avoid contamination of seed, feed and foodstuffs.

This product is toxic to fish. Keep out of lakes, ponds and streams.

Do not reuse container. Destroy when empty.

PESTS
UNIT II

ANSWERS TO ASSIGNMENT SHEET

1. a. Insects
   b. Larva
2. a. Plant diseases (fungi)
   b. Parasitic
3. a. Weeds
   b. Both
   c. Annuals

PESTS
UNIT II

TEST

1. Match the terms on the right to the correct definition. (Definitions are continued on the following page.)

_____a. Any living thing

_____b. Harmful condition which affects plant life

_____c. Unwanted organism

_____d. Organism that lives and feeds in or on another organism

_____e. Small invertebrate animal with three body regions and six jointed legs; may have two, four, or no wings

_____f. One-celled microorganism

_____g. Young insect that does not look like an adult insect

_____h. Young insect that looks similar to an adult insect

_____i. Small worm organism that feeds on or in plants and animals

_____j. Feeling or signal that something is wrong, such as change in growth habits

_____k. Plant that grows two years, produces seed, and then dies

_____l. Stages in the life development of organisms

_____m. Insect in the nonfeeding, usually immobile stage

_____n. Animals closely related to insects but with two body regions, eight jointed legs, and no wings

1. Pest
2. Insect
3. Mite, tick, and spider
4. Plant disease
5. Nematode
6. Parasite
7. Life cycle
8. Larva
9. Pupa
10. Nymph
11. Organism
12. Fungus
13. Bacterium
14. Annual
15. Sign or symptom
16. Vertebrate
17. Perennial
18. Biennial

______o. Plant that normally lives for more than two years

______p. Small plant which causes rot, mold, and plant disease

______q. Animal with a bony spinal column

______r. Plant that grows from seed, produces seed the same year, and then dies

2. List three main groups of pests.

   a.

   b.

   c.

3. List three ways insects may damage crops.

   a.

   b.

   c.

4. List two ways insects affect livestock and man.

   a.

   b.

5. Name two identifying characteristics common to all adult insects.

   a.

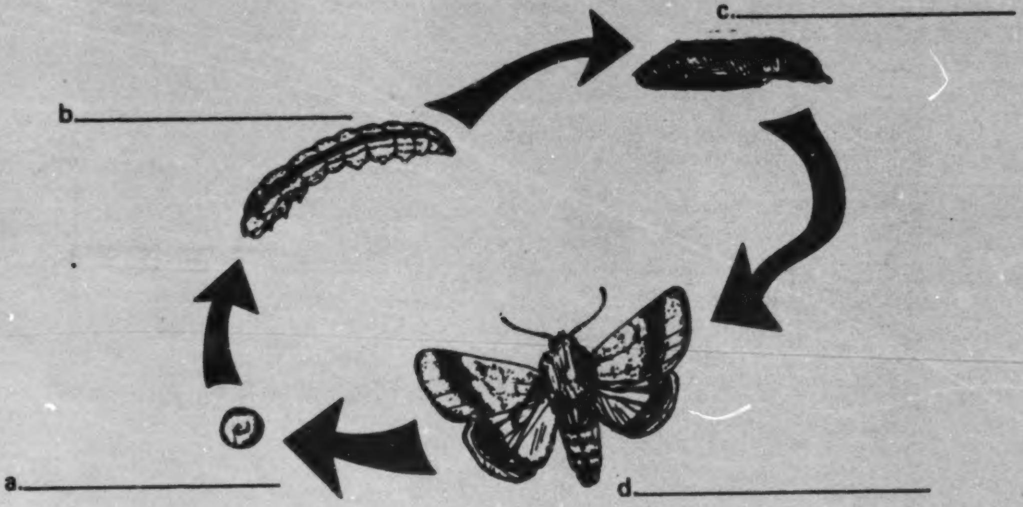
   b.

6. Name two characteristics which aid in distinguishing one insect from another.

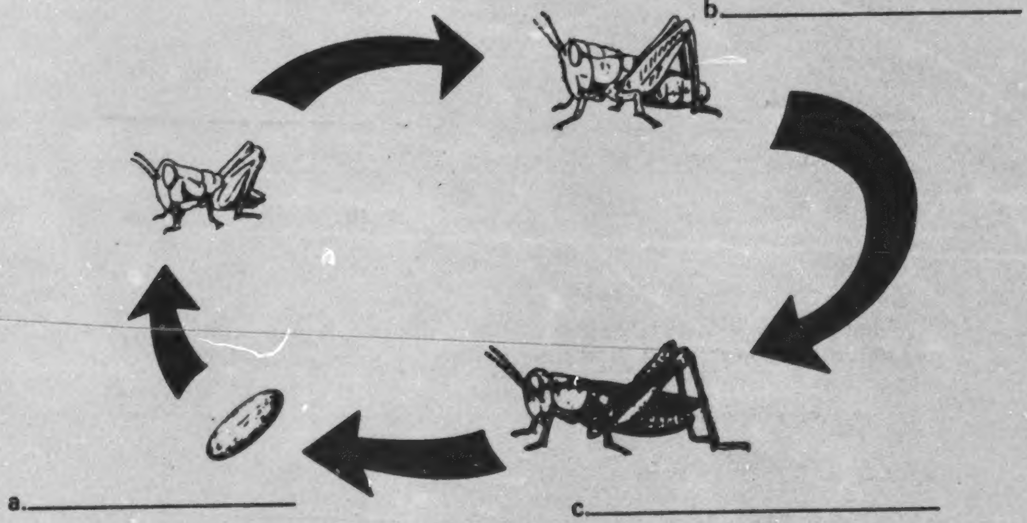
   a.

   b.

7. Identify the four stage life cycle of insects by writing the correct names in the blanks provided.



8. Identify the three stage life cycle of insects by writing the correct names in the blanks provided.



9. Name three identifying characteristics of mites, ticks, and spiders.

a.

b.

c.

10. List three vertebrate pest animals.

a.

b.

c.

11. State the difference between grasses and broadleaf plants.

12. Classify the following plants as annuals (A), biennials (B), or perennials (P) by placing an "A", "B", or "P" in front of each plant name.

_____a. Foxtail

_____b. Mullein

_____c. Henbit

_____d. Johnson grass

13. List two main causes of plant diseases.

a.

b.

14. Classify the following causes of plant diseases as parasitic (P) or nonparasitic (N) by placing a "P" or "N" in front of each cause.

_____a. Air pollution

_____b. Chemicals

_____c. Bacteria

_____d. Fungi

15. List four symptoms of plant diseases.

a.

b.

c.

d.

16. Describe symptoms of nematode damage.

17. Name four sources for aid in identifying pests.

a.

b.

c.

d.

18. Interpret the following label to answer the questions below.

a. What type of pests does this pesticide control?

b. When applied at 5# per acre, what types of weeds will this pesticide control?

PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS

(CAUTION)

[illegible]

ENVIRONMENTAL HAZARDS

[illegible]

DIRECTIONS FOR USE
GENERAL CLASSIFICATION

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

STORAGE AND DISPOSAL

[illegible]

DE WEED

HERBICIDE
WETTABLE POWDER

ACTIVE INGREDIENT: [illegible] 80.0%
INERT INGREDIENTS: 20.0%
TOTAL: 100.0%

KEEP OUT OF REACH OF CHILDREN

CAUTION

STATEMENT OF PRACTICAL TREATMENT

IF SWALLOWED Induce vomiting
IF INHALED Remove to fresh air.
IF IN EYES Flush eyes with plenty of water
IF ON SKIN Remove clothing and wash with detergent and water.

MFG BY A-Z CHEMICALS
TOWN, STATE

EPA ESTABLISHMENT NO. 1357–STATE–1
EPA REGISTRATION NO. 1357-41

NET WEIGHT FIVE POUNDS

DIRECTIONS FOR USE
CONTINUED

[illegible]

GROUND APPLICATION: [illegible]

BLUEBERRIES and CANEBERRIES [illegible]

ALFALFA—[illegible]

GRASSES GROWN FOR SEED [illegible]

WEED CONTROL [illegible]

PESTS
UNIT II

ANSWERS TO TEST

1.

a.	11	g.	8	m.	9
b.	4	h.	10	n.	3
c.	1	i.	5	o.	17
d.	6	j.	15	p.	12
e.	2	k.	18	q.	16
f.	13	l.	7	r.	14

2. Any three of the following:
   a. Insects
   b. Mites, ticks, and spiders
   c. Plant diseases
   d. Nematodes
   e. Vertebrate animals
   f. Weeds
3. Any three of the following:
   a. Chew foliage
   b. Tunnel or bore into stems, stalks, and branches
   c. Feed on and tunnel in roots
   d. Suck the sap from leaves
   e. Carry plant disease agents
4. Any two of the following:
   a. Blood sucking
   b. Direct attack and spread of disease organisms
   c. Living on or in the animal
5. a. Six jointed legs
   b. Three body regions

6. a. Wings

b. Mouthparts

7. a. Egg

b. Larva

c. Pupa

d. Adult

8. a. Egg

b. Nymph

c. Adult

9. a. Eight jointed legs

b. Two body regions

c. No wings

10. Any three of the following:

a. Birds

b. Mammals

c. Fish

d. Reptiles

e. Amphibians

11. a. Grasses have long narrow leaves

b. Broadleaf plants have wide, flat leaves and netted veins

12. a. A c. A

b. B d. P

13. a. Nonparasitic

b. Parasitic

14. a. N c. P

b. N d. P

15. Any four of the following:

  a. Decaying or rotting
  b. Abnormal growth
  c. Underdevelopment or stunting
  d. Wilting
  e. Discoloration

16. Description should include:

  a. Similar to plant disease symptoms on plant parts above ground
  b. Swollen roots with lesions (scars)

17. a. Vocational agriculture instructor
  b. County extension agent
  c. Pesticide dealer or representative
  d. Land grant university

18. a. Weeds
  b. Annual broadleaf and grass weeds

ENVIRONMENTAL PROTECTION
UNIT III

TERMINAL OBJECTIVE

After completion of this unit, the student should be able to discuss reasons for protecting the environment, select from a list the ways pesticides aid in making the environment better, and interpret pesticide labels. This knowledge will be evidenced through demonstration and by scoring eighty-five percent on the unit test.

SPECIFIC OBJECTIVES

After completion of this unit, the student should be able to:

1. Match terms associated with pesticides and environmental protection to the correct definitions.
2. List resources necessary for man to exist.
3. Discuss in a short paragraph the reasons for protecting the environment.
4. Select from a list ways pesticides help the environment.
5. List ways pesticides can harm the environment.
6. Explain in a short paragraph how pesticides can disrupt the food chain.
7. Match the classifications of pesticides according to buildup to the correct definitions.
8. List things the applicator must consider before applying a pesticide on or near a desirable plant.
9. Name the major ways by which pesticides accumulate.
10. List means by which pesticides pollute streams, ponds, and water systems.
11. Discuss in a short paragraph ways pesticides may aid the target pest instead of controlling it.
12. Interpret pesticide labels correctly when given questions on environmental protection and labels.

ENVIRONMENTAL PROTECTION
UNIT III

SUGGESTED ACTIVITIES

I. Instructor:

   A. Provide student with objective sheet.

   B. Provide student with information and assignment sheets.

   C. Make transparencies.

   D. Discuss terminal and specific objectives.

   E. Discuss information and assignment sheets.

   (NOTE: Instructors may want to provide additional assignment sheets using labels common to the community.)

   F. Give test.

II. Student:

   A. Read the objective sheet.

   B. Read and study information sheet.

   C. Complete assignment sheets.

   D. Take test.

INSTRUCTIONAL MATERIALS

I. Objective sheet

II. Information sheet

III. Transparency masters

   A. TM 1--Food Chain

   B. TM 2--Accumulation of Pesticides

   C. TM 3--Pollution by Pesticides

IV. Assignment sheets

   A. Assignment Sheet #1--Draw a Food Chain Using Farm Animals

   B. Assignment Sheet #2--Interpret Pesticide Labels

V. Answers to assignment sheets

VI. Test

VII. Answers to test

ENVIRONMENTAL PROTECTION
UNIT III

INFORMATION SHEET

I. Terms and definitions

   A. Environment--Your surroundings such as water, air, soil, plants, and animals

   B. Ecology--Study of the relationship between a plant or animal and its surroundings

   C. Food chain--Way of describing how all animals depend on each other for food

      (NOTE: It is the link between the plant-eaters, plants, and meat-eaters.)

   D. Phytotoxicity--Causing injury to plant life; poisonous to plant life

   E. Vaporization--Process of becoming a gas

   F. Drift--Movement of pesticide droplets or particles by wind and air currents from the target area to an area not intended to be treated

   G. Target--Area, building, plant, animal, or pest intended to be treated with pesticide

   H. Residue--Amount of pesticide that remains on or in a crop or animal or on a surface following application

II. Resources necessary for man to exist

   (NOTE: The surroundings in which man lives and the resources he depends on makes up his environment.)

   A. Place to live

   B. Clean water

   C. Clean air

   D. Food

   E. Clean soil

III. Reasons for protecting the environment

   A. Clean water is essential for man and animal

   B. Soil is necessary to grow crops

   C. Clean air to breathe is essential

D. Bees and other pollinators must be protected

E. Wildlife is essential for a balance of nature

F. Recreational areas are desirable for man

IV. Ways pesticides help environment

A. Control pests

B. Enable more food to be produced on same area

C. Control plant diseases, parasites, and insects

D. Control animal diseases, parasites, and insects

E. Preserve outdoor activities

V. Ways pesticides harm the environment

A. Cause nature imbalance

B. Pollute streams and water supply

C. Pollute crops

D. Pollute soil

E. Kill desirable plants

F. Build up residue in meat animals

VI. How pesticides disrupt food chain (Transparency 1, Assignment Sheet #1)

A. Each animal has a place in the food chain, depending on the type of food it eats

1. Animals that eat only plants are on the lowest level

2. Animals which eat plants and animals, including insects, are on the next level

3. Animals that eat only meat are on the top of the chain

B. Meat eaters may be poisoned by pesticides by eating other animals that have accumulated pesticides in their bodies

(NOTE: Animals do not have to directly contact the pesticide spray or application for it to cause harm.)

C. When plants or animals, including insects, in the lower level of the food chain are killed by pesticides, then animals in levels above them may starve

INFORMATION SHEET

VII. Classifications of pesticides according to buildup

A. Accumulative--Pesticide that can build up in the body of an animal

(NOTE: This pesticide does not readily break down; it may build up in an animal's body until it becomes harmful.)

B. Nonaccumulative--Pesticide that does not build up in the body of an animal

(NOTE: This chemical may or may not break down rapidly into other relatively harmless materials.)

C. Persistent--Pesticide that stays in the environment for a rather long period of time without change in form

(NOTE: This chemical does not necessarily build up but can be harmful. For example, atrazine in the soil does not harm animals or wildlife but does restrict growth of certain plants for a long time after application.)

D. Nonpersistent--Pesticide that does not stay in the environment for a long period of time

(NOTE: This chemical breaks down into relatively harmless materials.)

VIII. Things applicator must consider before applying pesticide on or near desirable plants

A. Type of pesticide

(NOTE: Herbicides may be especially hazardous to desirable plants.)

B. Movement

(NOTE: Movement may include drift, runoff, erosion, leaching, and vaporization.)

C. Weather conditions

(NOTE: Weather conditions may include soil moisture, rain, humidity, temperature, and light.)

D. Form of pesticide

(NOTE: Granules and low pressure sprays are less likely to move off target than dusts and high pressure sprays.)

E. Proper dosage

(NOTE: Overdosing may cause phytotoxicity even when proper doses will not.)

INFORMATION SHEET

F. Persistence

(NOTE: Persistent pesticides may affect future plants to be grown in that area.)

G. Type of pesticide used previously in the sprayer

(NOTE: Even very small amounts of some herbicides which may remain in the sprayer can cause phytotoxicity on sensitive plants.)

(CAUTION: Before applying any pesticide, READ THE LABEL AND FOLLOW DIRECTIONS.)

IX. Major ways pesticides accumulate (Transparency 2)

A. Through the food chain when animals eat plants or other animals

B. By building up to high levels over a period of time when taken in directly and stored in the animal

X. Means by which pesticides pollute streams, ponds, and water systems (Transparency 3)

A. Overdose

B. Runoff by irrigation

C. Runoff caused by rain

D. Drift

E. Carelessness

F. Improper disposal of containers

G. Improper disposal of unused chemicals

XI. Ways pesticide may aid target pest instead of controlling it

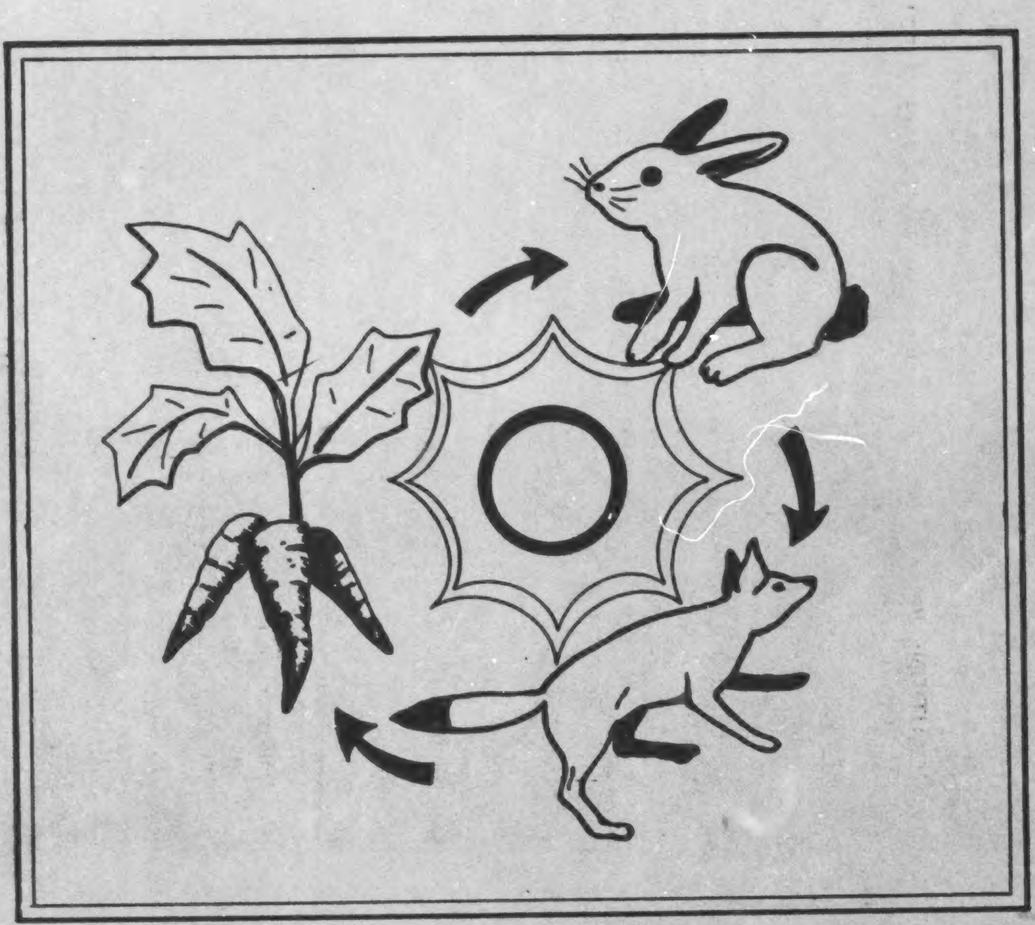
A. Death of natural enemy

B. Broken food chain

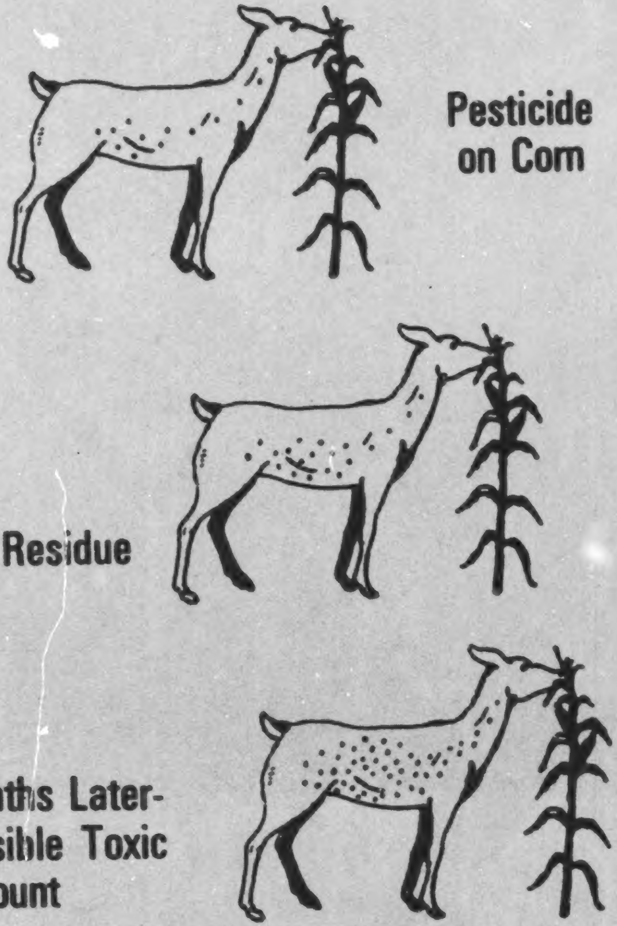
C. Improper use of chemical

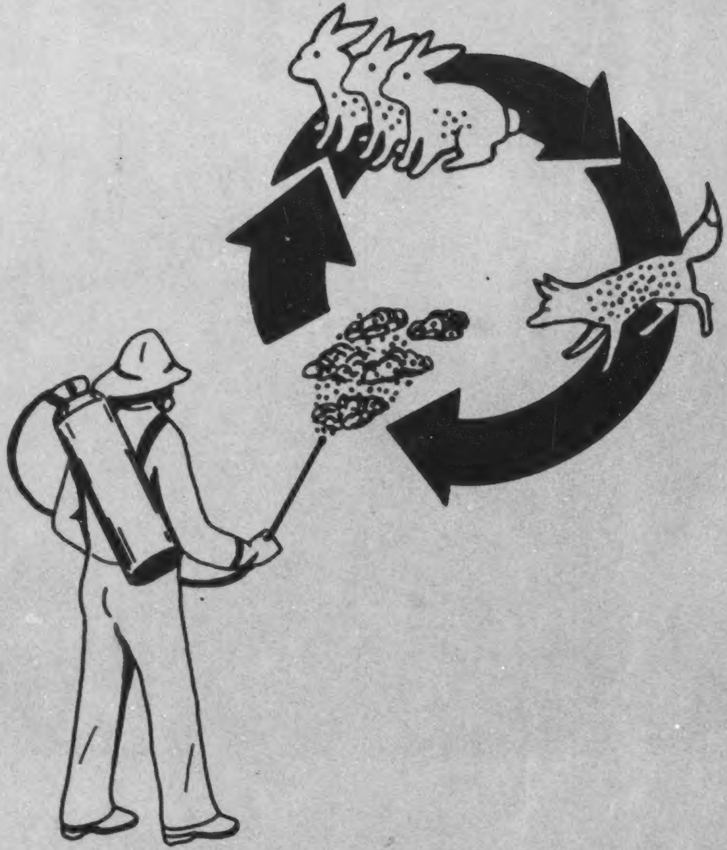
D. Resistance to chemical

Food Chain



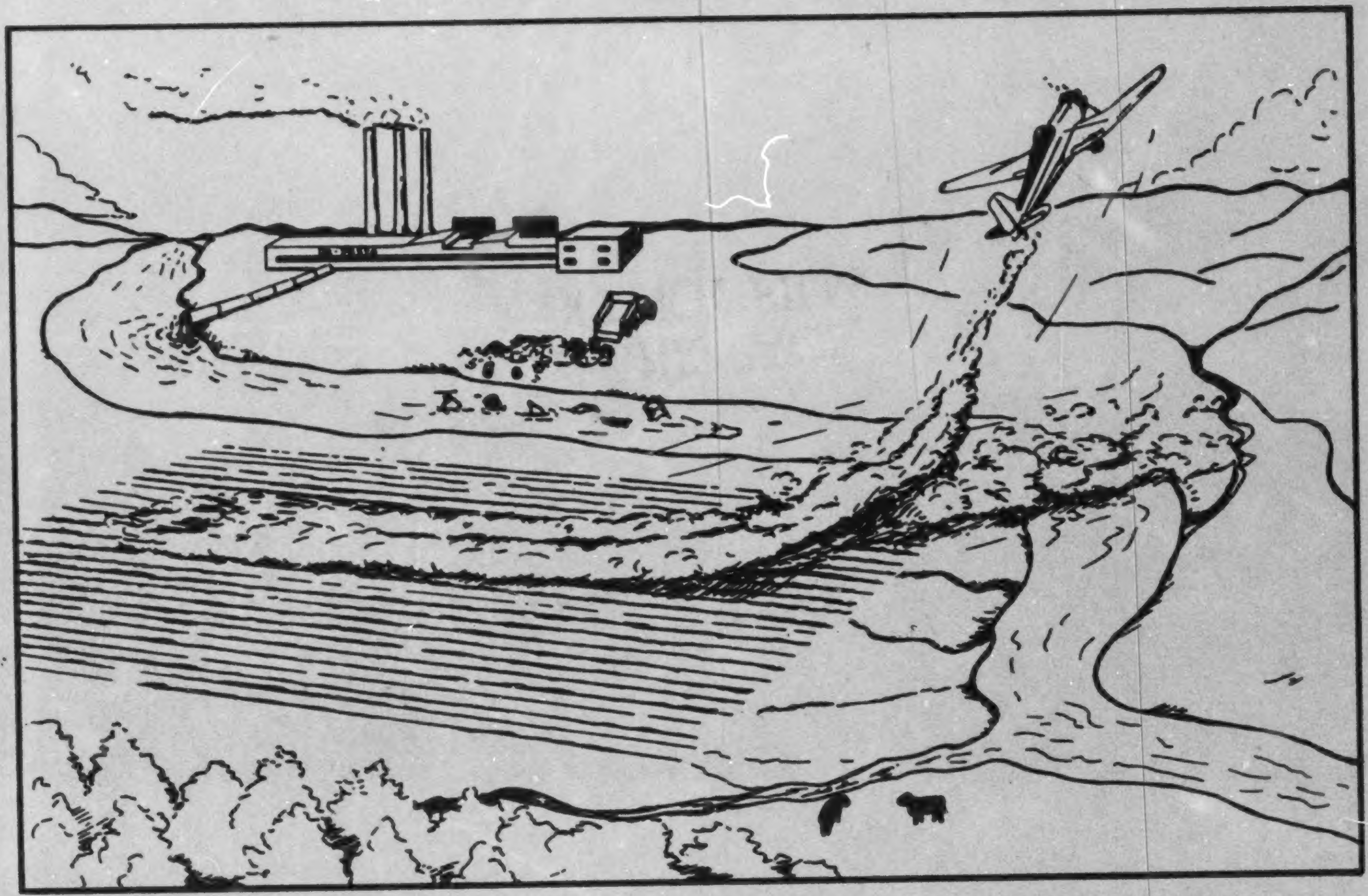
Accumulation of Pesticides


Pesticide
on Corn
Weeks
Later - Residue
Months Later-
Possible Toxic
Amount



TM 2

Pollution by Pesticides



ASSIGNMENT SHEET #1–DRAW A FOOD CHAIN USING FARM ANIMALS

Draw a food chain using crops such as hay, forage, or grain and animals such as cattle, calves, sheep, poultry, hogs and goats.

ENVIRONMENTAL PROTECTION
UNIT III

ASSIGNMENT SHEET #2--INTERPRET PESTICIDE LABELS

Read the labels provided on the following pages and answer the questions below.

(NOTE: Instructors may want to provide additional assignment sheets using labels common to the community.)

1. Using the De Metho label, answer the questions below.

   a. Would De Metho be a good choice of pesticide if your farm was next to a bird sanctuary or wildlife refuge? Explain your answer.

   b. Would De Metho be a good choice of pesticide if your crops were in full bloom? Explain your answer.

2. Using the Anti-Weed label, answer the questions below.

   a. Would Anti-Weed be a good choice of pesticide if your farm was next to a bird sanctuary or wildlife refuge? Explain your answer.

b. Would Anti-Weed be a good choice of pesticide if your crops were next to sensitive plants such as flowers? Explain your answer.

c. Would Anti-Weed be a good choice of pesticide if you want to plant beans in that field the next year? Why?

d. How would you classify this pesticide using the buildup classification? Mark the blank by the correct answer.

_____1) Accumulative

_____2) Nonaccumulative

_____3) Persistent

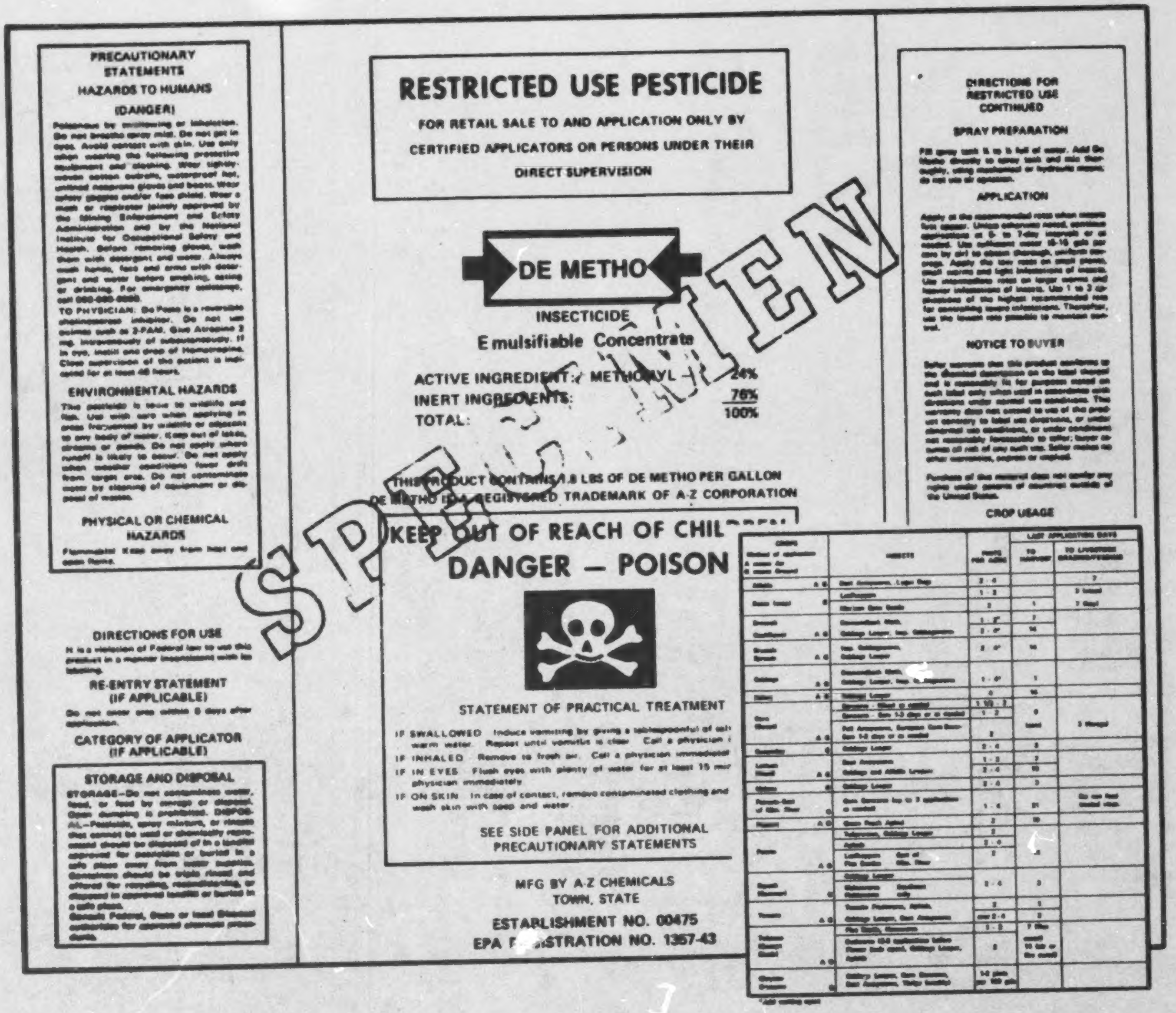
_____4) Nonpersistent

3. Using the No-Disease label, answer the questions below.

a. Would No-Disease be a good choice of pesticide if drift or runoff would likely enter a stream? Explain your answer.

b. Would No-Disease be a good choice of a pesticide if your crops were in full bloom. Explain your answer.

ASSIGNMENT SHEET #2



PRECAUTIONARY STATEMENTS
HAZARDS TO HUMANS
(DANGER)

TO PHYSICIAN:

ENVIRONMENTAL HAZARDS

PHYSICAL OR CHEMICAL HAZARDS

DIRECTIONS FOR USE

RE-ENTRY STATEMENT (IF APPLICABLE)

CATEGORY OF APPLICATOR (IF APPLICABLE)

STORAGE AND DISPOSAL

RESTRICTED USE PESTICIDE

FOR RETAIL SALE TO AND APPLICATION ONLY BY CERTIFIED APPLICATORS OR PERSONS UNDER THEIR DIRECT SUPERVISION

DE METHO

INSECTICIDE
Emulsifiable Concentrate

ACTIVE INGREDIENT: METHOMYL	24%
INERT INGREDIENTS:	76%
TOTAL:	100%

THIS PRODUCT CONTAINS 1.8 LBS OF DE METHO PER GALLON
DE METHO IS A REGISTERED TRADEMARK OF A-Z CORPORATION

KEEP OUT OF REACH OF CHIL

DANGER — POISON

SPECIMEN

STATEMENT OF PRACTICAL TREATMENT

IF SWALLOWED Induce vomiting by giving a tablespoonful of salt warm water. Repeat until vomitus is clear. Call a physician i

IF INHALED Remove to fresh air. Call a physician immediatel

IF IN EYES Flush eyes with plenty of water for at least 15 mir physician immediately

IF ON SKIN In case of contact, remove contaminated clothing and wash skin with soap and water.

SEE SIDE PANEL FOR ADDITIONAL PRECAUTIONARY STATEMENTS

MFG BY A-Z CHEMICALS
TOWN, STATE

ESTABLISHMENT NO. 00475
EPA REGISTRATION NO. 1357-43

DIRECTIONS FOR RESTRICTED USE CONTINUED

SPRAY PREPARATION

APPLICATION

NOTICE TO BUYER

CROP USAGE

ASSIGNMENT SHEET #2

Anti-Weed

20G

SAMPLE LABEL

Herbicide

FOR WEED CONTROL IN CORN

50
Pounds
NET WEIGHT

Active Ingredients: 20.0%
Atrazine: 2-chloro-4-Ethylamino-6-isopropylamino-s-triazine . . . 6.32%
Related compounds . . .34%
2-chloro-N-isopropyl-acetanilide . . 13.34%
Inert Ingredients: 80.0%
Total: 100.0%

Anti-Weed 20G is a granular herbicide

Warning:

Keep out of reach of children. See additional warning statements on back of bag.

EPA Reg. No. 1000-519

KILL-DEAD
Chemical Company

ASSIGNMENT SHEET #2

DIRECTIONS FOR USE AND CONDITIONS OF SALE AND WARRANTY

IMPORTANT: Read the entire **Directions For Use** and the **Conditions Of Sale And Warranty** before using this product.

Conditions Of Sale And Warranty

The **Directions For Use** of this product reflect the opinion of experts based on field use and tests. The directions are believed to be reliable and should be followed carefully. However, it is impossible to eliminate all risks inherently associated with use of this product. Crop injury, ineffectiveness or other unintended consequences may result because of such factors as weather conditions, presence of other materials or the manner of use or application all of which are beyond the control of or the Seller. All such risks shall be assumed by the Buyer.

warrants that this product conforms to the chemical description on the label and is reasonably fit for the purposes referred to in the **Directions For Use,** subject to the inherent risks referred to above. **makes no other express or implied warranty of Fitness or Merchantability or any other express or implied warranty.** In no case shall or the Seller be liable for consequential, special or indirect damages resulting from the use or handling of this product. and the Seller offer this product and the Buyer and user accept it, subject to the foregoing **Conditions Of Sale And Warranty** which may be varied only by agreement in writing signed by a duly authorized representative of

General Information

Anti-Weed will control most annual broadleaf and grass weeds in field corn, silage corn and sweet corn. It should be applied prior to weed and crop emergence.

Since Anti-Weed acts mainly through root absorption, its effectiveness depends on rainfall or irrigation to move it into the root zone. Best results are obtained when moisture occurs within 10 days after application. Should moisture not occur within this period or should weeds develop, a shallow cultivation or rotary hoeing will generally result in better weed control.

Anti-Weed is noncorrosive to equipment and metal surfaces, nonflammable and has low electrical conductivity.

Care should be taken to avoid using Anti-Weed where adjacent desirable trees, shrubs or plants might be injured.

Store Anti-Weed in a dry place.

Application Instructions

Broadcast or Overall Treatment

Use broadcast applicators or fertilizer spreaders that can apply small amounts of granules evenly.

Band Treatment

Use applicators designed for this purpose. Calculate the amount of granules per acre needed for band treatment as follows:

$$\frac{\text{Band Width in Inches}}{\text{Inches Between Crop Rows}} \times \begin{array}{c}\text{Recommended}\\ \text{Broadcast Rate}\end{array} = \begin{array}{l}\text{lbs./Acre}\\ \text{Anti-Weed}\\ \text{for Band}\\ \text{Treatment}\end{array}$$

Range of Rates: In each case where a range of rates is given, the lower rate should be used on soils low in organic matter and the higher rate should be used on soils high in organic matter.

Directions for Use

Anti-Weed controls most annual broadleaf and grass weeds such as:

Giant Foxtail
Green Foxtail
Yellow Foxtail
Barnyardgrass
(Watergrass)
Crabgrass

Fall Panicum
Annual Morningglory
Cocklebur
Sandbur
Jimsonweed
Lambsquarters

Mustard
Pigweed
Ragweed
Smartweed
Sunflower
Velvetleaf

Anti-Weed will not control perennial weeds such as:

Johnsongrass Field Bindweed Canada Thistle Bull Nettle

Apply Anti-Weed at planting behind the press wheel or immediately after planting prior to emergence of either crop or weeds. See table below for recommended rates.

Soil	**Rate per acre of Anti-Weed Broadcast**
Light soils: Sands, loamy sands, and sandy loams	15 lbs.
Medium to heavy soils including the dark prairie soils in the Corn Belt**	22.5– 30 lbs.

*For calculation of band treatment rate, see Application Instructions Section.

** Anti-Weed should not be used on high organic soils such as peat and muck.

Suggestions for Crop Rotations

1) Corn may be replanted at any time following application of Anti-Weed . 2) Sorghum may be seeded in all areas the spring following application of the granules. 3) Soybeans may be seeded in Louisiana, Arkansas, Missouri, Iowa and Southeastern Minnesota and areas east of these states the spring following applications made not later than June 1 of the previous year.

Precautions: 1) Do not plant sugar beets, tobacco, vegetables (including dry beans), spring-seeded small grains or small-seeded legumes and grasses the year following Anti-Weed application or injury may occur. 2) Following harvest of a treated crop, plow (moldboard or disk-plow) and thoroughly till the soil in the fall or spring to minimize possible injury to rotational spring-seeded crops. 3) Injury to rotational crops following application may occur on eroded hillsides, alkali outcroppings, gravelly areas and on soils in general with pH near or exceeding 7.5. 4) Do not graze treated area or feed treated forage to livestock for 21 days following application.

Warning

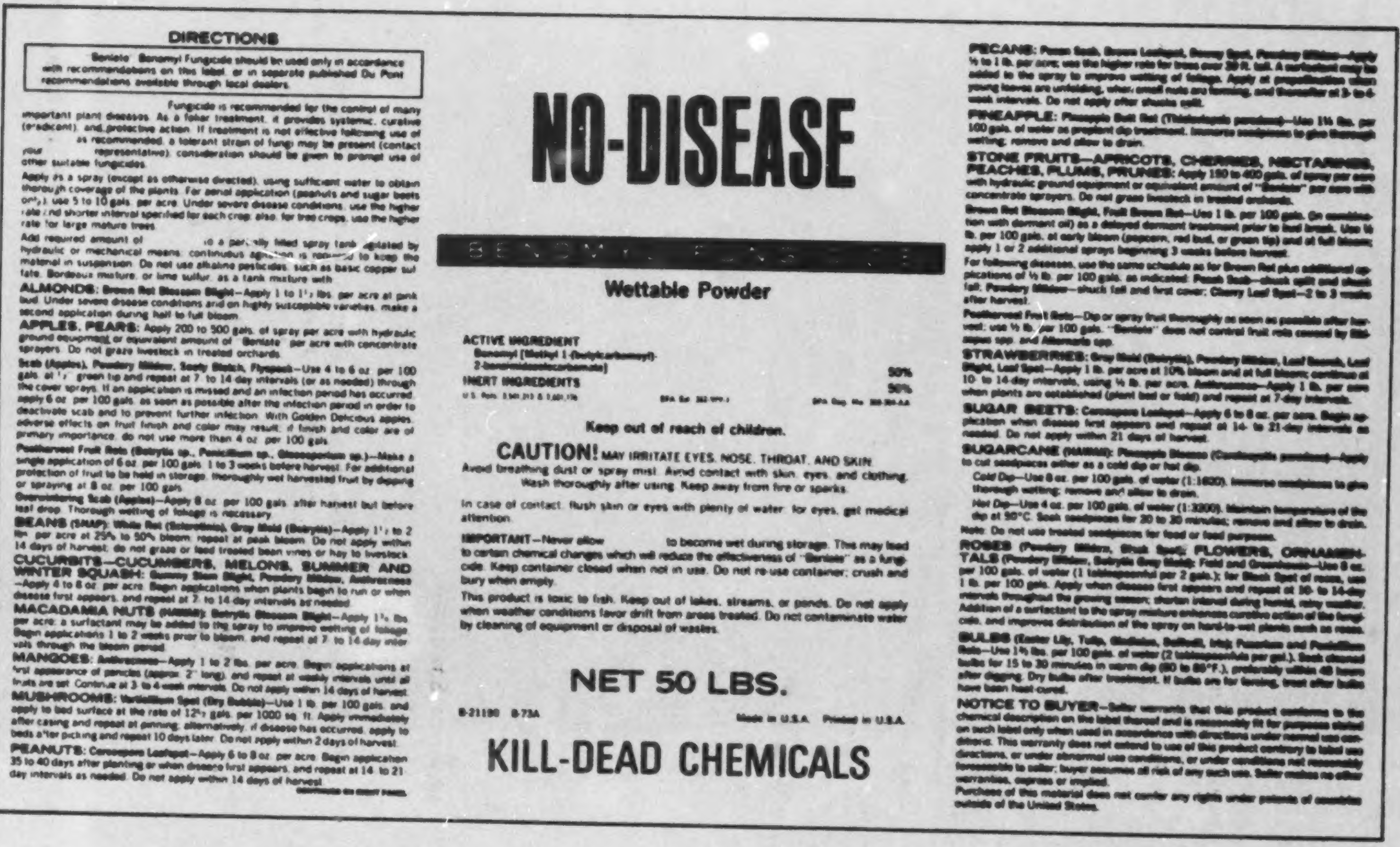
Keep out of reach of children.

Irritating to skin, eyes, nose and throat. May be harmful if swallowed. May cause allergic skin reaction. Do not get in eyes, on skin or on clothing. Avoid breathing dust. Do not take internally. While handling, wear rubber gloves. In case of contact, flush skin or eyes with plenty of water; for eyes, get medical attention. Launder clothing before reuse. Avoid contamination of seed, feed and foodstuffs.

This product is toxic to fish. Keep out of lakes, ponds and streams.

Do not reuse container. Destroy when empty.

ASSIGNMENT SHEET #2



DIRECTIONS

"Benlate" Benomyl Fungicide should be used only in accordance with recommendations on this label, or in separate published Du Pont recommendations available through local dealers.

Fungicide is recommended for the control of many important plant diseases. As a foliar treatment, it provides systemic, curative (eradicant), and protective action. If treatment is not effective following use of as recommended, a tolerant strain of fungi may be present (contact your representative); consideration should be given to prompt use of other suitable fungicides.

Apply as a spray (except as otherwise directed), using sufficient water to obtain thorough coverage of the plants. For aerial application (peanuts and sugar beets only), use 5 to 10 gals. per acre. Under severe disease conditions, use the higher rate and shorter interval specified for each crop; also, for tree crops, use the higher rate for large mature trees.

Add required amount of to a partially filled spray tank agitated by hydraulic or mechanical means; continuous agitation is required to keep the material in suspension. Do not use alkaline pesticides, such as basic copper sulfate, Bordeaux mixture, or lime sulfur, as a tank mixture with

ALMONDS: Brown Rot Blossom Blight—Apply 1 to 1½ lbs. per acre at pink bud. Under severe disease conditions and on highly susceptible varieties, make a second application during half to full bloom.

APPLES, PEARS: Apply 200 to 500 gals. of spray per acre with hydraulic ground equipment or equivalent amount of "Benlate" per acre with concentrate sprayers. Do not graze livestock in treated orchards.

Scab (Apples), Powdery Mildew, Sooty Blotch, Flyspeck—Use 4 to 6 oz. per 100 gals. at ½" green tip and repeat at 7- to 14-day intervals (or as needed) through the cover sprays. If an application is missed and an infection period has occurred, apply 6 oz. per 100 gals. as soon as possible after the infection period in order to deactivate scab and to prevent further infection. With Golden Delicious apples, adverse effects on fruit finish and color may result; if finish and color are of primary importance, do not use more than 4 oz. per 100 gals.

Postharvest Fruit Rots (Botrytis sp., Penicillium sp., Gloeosporium sp.)—Make a single application of 6 oz. per 100 gals. 1 to 3 weeks before harvest. For additional protection of fruit to be held in storage, thoroughly wet harvested fruit by dipping or spraying at 8 oz. per 100 gals.

Overwintering Scab (Apples)—Apply 8 oz. per 100 gals. after harvest but before leaf drop. Thorough wetting of foliage is necessary.

BEANS (SNAP): White Rot (Sclerotinia), Gray Mold (Botrytis)—Apply 1½ to 2 lbs. per acre at 25% to 50% bloom; repeat at peak bloom. Do not apply within 14 days of harvest; do not graze or feed treated bean vines or hay to livestock.

CUCURBITS—CUCUMBERS, MELONS, SUMMER AND WINTER SQUASH: Gummy Stem Blight, Powdery Mildew, Anthracnose—Apply 4 to 8 oz. per acre. Begin applications when plants begin to run or when disease first appears, and repeat at 7- to 14-day intervals as needed.

MACADAMIA NUTS (HAWAII): Botrytis Blossom Blight—Apply 1½ lbs. per acre; a surfactant may be added to the spray to improve wetting of foliage. Begin applications 1 to 2 weeks prior to bloom, and repeat at 7- to 14-day intervals through the bloom period.

MANGOES: Anthracnose—Apply 1 to 2 lbs. per acre. Begin applications at first appearance of panicles (approx. 2" long), and repeat at weekly intervals until all fruits are set. Continue at 3- to 4-week intervals. Do not apply within 14 days of harvest.

MUSHROOMS: Verticillium Spot (Dry Bubble)—Use 1 lb. per 100 gals. and apply to bed surface at the rate of 12½ gals. per 1000 sq. ft. Apply immediately after casing and repeat at pinning; alternatively, if disease has occurred, apply to beds after picking and repeat 10 days later. Do not apply within 2 days of harvest.

PEANUTS: Cercospora Leafspot—Apply 6 to 8 oz. per acre. Begin application 35 to 40 days after planting or when disease first appears, and repeat at 14- to 21-day intervals as needed. Do not apply within 14 days of harvest.

CONTINUED ON RIGHT PANEL

NO-DISEASE

BENOMYL FUNGICIDE

Wettable Powder

ACTIVE INGREDIENT Benomyl [Methyl 1-(butylcarbamoyl)-2-benzimidazolecarbamate]	50%
INERT INGREDIENTS	50%

U.S. Pats. 3,541,213 & 3,631,176 EPA Est. 352-VPV-1 EPA Reg. No. 352-354-AA

Keep out of reach of children.

CAUTION! MAY IRRITATE EYES, NOSE, THROAT, AND SKIN. Avoid breathing dust or spray mist. Avoid contact with skin, eyes, and clothing. Wash thoroughly after using. Keep away from fire or sparks.

In case of contact, flush skin or eyes with plenty of water; for eyes, get medical attention.

IMPORTANT—Never allow to become wet during storage. This may lead to certain chemical changes which will reduce the effectiveness of "Benlate" as a fungicide. Keep container closed when not in use. Do not re-use container; crush and bury when empty.

This product is toxic to fish. Keep out of lakes, streams, or ponds. Do not apply when weather conditions favor drift from areas treated. Do not contaminate water by cleaning of equipment or disposal of wastes.

NET 50 LBS.

B-21180 8-73A Made in U.S.A. Printed in U.S.A.

KILL-DEAD CHEMICALS

PECANS: Pecan Scab, Brown Leafspot, Downy Spot, Powdery Mildew—Apply ½ to 1 lb. per acre; use the higher rate for trees over 30 ft. tall. A surfactant may be added to the spray to improve wetting of foliage. Apply at prepollination (when young leaves are unfolding), when small nuts are forming, and thereafter at 3- to 4-week intervals. Do not apply after shucks split.

PINEAPPLE: Pineapple Butt Rot (Thielaviopsis paradoxa)—Use 1½ lbs. per 100 gals. of water as preplant dip treatment. Immerse seedpieces to give thorough wetting; remove and allow to drain.

STONE FRUITS—APRICOTS, CHERRIES, NECTARINES, PEACHES, PLUMS, PRUNES: Apply 150 to 400 gals. of spray per acre with hydraulic ground equipment or equivalent amount of "Benlate" per acre with concentrate sprayers. Do not graze livestock in treated orchards.

Brown Rot Blossom Blight, Fruit Brown Rot—Use 1 lb. per 100 gals. (in combination with dormant oil) as a delayed dormant treatment prior to bud break. Use ½ lb. per 100 gals. at early bloom (popcorn, red bud, or green tip) and at full bloom; apply 1 or 2 additional sprays beginning 3 weeks before harvest.

For following diseases, use the same schedule as for Brown Rot plus additional applications of ½ lb. per 100 gals. as indicated: Peach Scab—shuck split and shuck fall; Powdery Mildew—shuck fall and first cover; Cherry Leaf Spot—2 to 3 weeks after harvest.

Postharvest Fruit Rots—Dip or spray fruit thoroughly as soon as possible after harvest; use ½ lb. per 100 gals. "Benlate" does not control fruit rots caused by Rhizopus spp. and Alternaria spp.

STRAWBERRIES: Gray Mold (Botrytis), Powdery Mildew, Leaf Scorch, Leaf Blight, Leaf Spot—Apply 1 lb. per acre at 10% bloom and at full bloom; continue at 10- to 14-day intervals, using ½ lb. per acre. Anthracnose—Apply 1 lb. per acre when plants are established (plant bed or field) and repeat at 7-day intervals.

SUGAR BEETS: Cercospora Leafspot—Apply 6 to 8 oz. per acre. Begin application when disease first appears and repeat at 14- to 21-day intervals as needed. Do not apply within 21 days of harvest.

SUGARCANE (HAWAII): Pineapple Disease (Ceratocystis paradoxa)—Apply to cut seedpieces either as a cold dip or hot dip.

Cold Dip—Use 8 oz. per 100 gals. of water (1:1600). Immerse seedpieces to give thorough wetting; remove and allow to drain.

Hot Dip—Use 4 oz. per 100 gals. of water (1:3200). Maintain temperature of the dip at 50°C. Soak seedpieces for 20 to 30 minutes; remove and allow to drain.

Note: Do not use treated seedpieces for food or feed purposes.

ROSES (Powdery Mildew, Black Spot); **FLOWERS, ORNAMENTALS** (Powdery Mildew, Botrytis Gray Mold); Field and Greenhouse—Use 8 oz. per 100 gals. of water (1 tablespoonful per 2 gals.); for Black Spot of roses, use 1 lb. per 100 gals. Apply when disease first appears and repeat at 10- to 14-day intervals throughout the growing season; shorten interval during humid, rainy weather. Addition of a surfactant to the spray mixture enhances curative action of the fungicide, and improves distribution of the spray on hard-to-wet plants such as roses.

BULBS (Easter Lily, Tulip, Gladiolus, Daffodil, Iris): Fusarium and Penicillium Rots—Use 1½ lbs. per 100 gals. of water (2 tablespoonfuls per gal.). Soak cleaned bulbs for 15 to 30 minutes in warm dip (80 to 85°F.), preferably within 48 hours after digging. Dry bulbs after treatment. If bulbs are for forcing, treat after bulbs have been heat-cured.

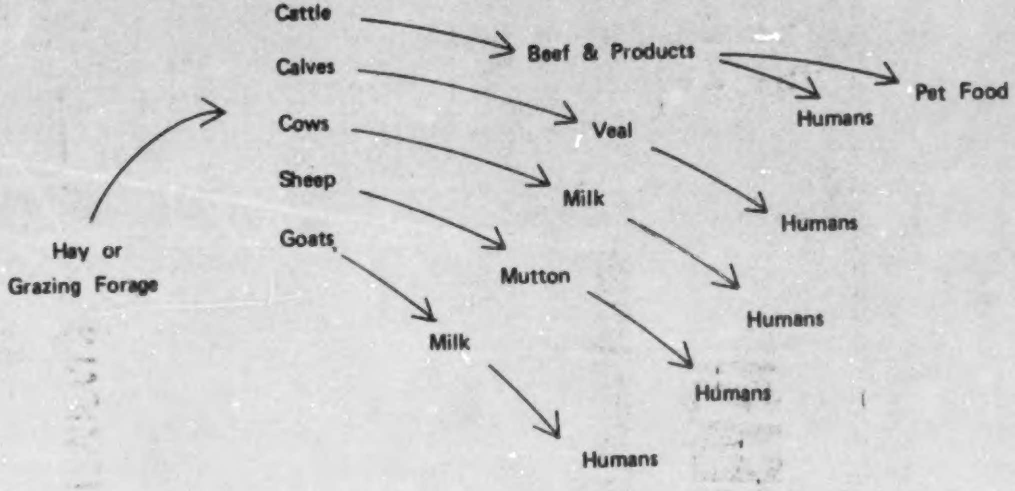
NOTICE TO BUYER—Seller warrants that this product conforms to the chemical description on the label thereof and is reasonably fit for purposes stated on such label only when used in accordance with directions under normal use conditions. This warranty does not extend to use of this product contrary to label use directions, or under abnormal use conditions, or under conditions not reasonably foreseeable to seller; buyer assumes all risk of any such use. Seller makes no other warranties, express or implied.

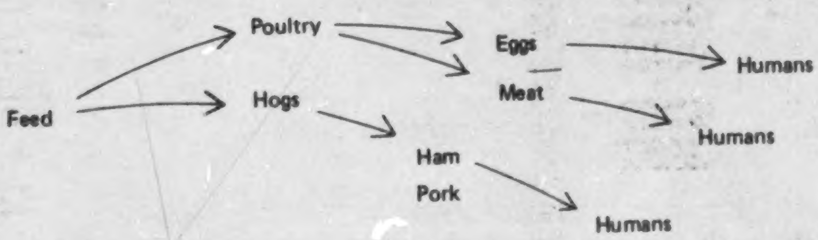
Purchase of this material does not confer any rights under patents of countries outside of the United States.

ENVIRONMENTAL PROTECTION
UNIT III

ANSWERS TO ASSIGNMENT SHEETS

Assignment Sheet #1


Cattle
Beef & Products
Pet Food
Humans
Calves
Veal
Humans
Cows
Milk
Humans
Sheep
Mutton
Humans
Goats
Milk
Humans
Hay or Grazing Forage


Poultry
Eggs
Meat
Humans
Humans
Feed
Hogs
Ham
Pork
Humans

Assignment Sheet #2

1. De Metho

   a. No. The environmental hazards statement states that this is toxic to birds and other wildlife and gives warning not to apply where runoff or drift is likely

   b. No. It is toxic to bees and should not be used when bees are actively visiting an area

2. Anti-Weed

   a. Yes. There is no warning about wildlife hazards

   b. No. Do not apply near desirable plants. It may cause injury

c. No. Anti-Weed is a persistent pesticide. For certain crops, including beans, it would be likely that injury would occur if planted the next year on treated soil

d. 3) Persistent

3. No-Disease

a. No. No-Disease is toxic to fish. Keep out of lakes, streams, and ponds

b. Yes. There is no statement concerning bee hazards

ENVIRONMENTAL PROTECTION
UNIT III

TEST

1. Match the terms on the right to the correct definition.

_____a. Amount of pesticide that remains on or in a crop or animal or on a surface following application

_____b. Movement of pesticide droplets or particles by wind and air currents from the target area to an area not intended to be treated

_____c. Way of describing how all animals depend on each other for food

_____d. Area, building, plant, animal, or pest intended to be treated with pesticide

_____e. Causing injury to plant life; poisonous to plant life

_____f. Study of the relationship between a plant or animal and its surroundings

_____g. Your surroundings such as water, air, soil, plants, and animals

_____h. Process of becoming a gas

1. Residue
2. Phytotoxicity
3. Target
4. Ecology
5. Drift
6. Environment
7. Food chain
8. Vaporization

2. List three resources necessary for man to exist.

a.

b.

c.

3. Discuss in a short paragraph the reasons for protecting the environment.

4. Select from the list below ways pesticides help the environment by placing an "X" in the blanks.

_____a. Kill all insects

_____b. Control pests

_____c. Enable more food to be produced on same area

_____d. Control plant diseases, parasites, and insects

_____e. Kill fish

_____f. Control animal diseases, parasites, and insects

5. List two ways pesticides can harm the environment.

a.

b.

6. Explain in a short paragraph how pesticides can disrupt the food chain.

7. Match the classifications of pesticides according to buildup on the right to the correct definition.

_____a. Pesticide that stays in the environment for a rather long period of time without change in form

_____b. Pesticide that does not build up in the body of an animal

_____c. Pesticide that can build up in the body of an animal

_____d. Pesticide that does not stay in the environment for a long period of time

1. Accumulative
2. Persistent
3. Nonaccumulative
4. Nonpersistent

8. List three things the applicator must consider before applying a pesticide on or near desirable plants.

a.

b.

c.

9. Name the two major ways pesticides accumulate.

a.

b.

10. List three means by which pesticides pollute streams, ponds, and water systems.

a.

b.

c.

11. Discuss in a short paragraph ways pesticide may aid the target pest instead of controlling it.

12. Interpret the following label by answering the questions below.

a. Would De Pesto be a good choice of a pesticide if you wish to spray near a wooded area used as a nesting site by many game birds?

_____YES _____NO Why?

b. Would you use this pesticide on the slopes which drain into your farm pond or local streams?

_____YES _____NO Why?

PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS

(DANGER)

Poisonous by swallowing or inhalation. Do not breathe spray mist. Do not get in eyes. Avoid contact with skin. Use only when wearing the following protective equipment and clothing. Wear tightly woven cotton overalls, waterproof hat, unlined neoprene gloves and boots. Wear safety goggles and/or face shield. Wear a mask or respirator jointly approved by the Mining Enforcement and Safety Administration and by the National Institute for Occupational Safety and Health. Before removing gloves, wash them with detergent and water. Always wash hands, face and arms with detergent and water before smoking, eating or drinking. For emergency assistance, call 000-000-0000.

TO PHYSICIAN: De Pesto is a reversible cholinesterase inhibitor. Do not use oximes such as 2-PAM. Give Atropine 2 mg. intravenously or subcutaneously. If in eye, instill one drop of Homatropine. Close supervision of the patient is indicated for at least 48 hours.

ENVIRONMENTAL HAZARDS

This pesticide is toxic to wildlife and fish. Use with care when applying in areas frequented by wildlife or adjacent to any body of water. Keep out of lakes, streams or ponds. Do not apply where runoff is likely to occur. Do not apply when weather conditions favor drift from target area. Do not contaminate water by cleaning of equipment or disposal of wastes.

PHYSICAL OR CHEMICAL HAZARDS

Flammable! Keep away from heat and open flame.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

RE-ENTRY STATEMENT (IF APPLICABLE)

Do not enter area within 5 days after application.

CATEGORY OF APPLICATOR (IF APPLICABLE)

STORAGE AND DISPOSAL

STORAGE—Do not contaminate water, food, or feed by storage or disposal. Open dumping is prohibited. DISPOSAL—Pesticide, spray mixture, or rinsate that cannot be used or chemically reprocessed should be disposed of in a landfill approved for pesticides or buried in a safe place away from water supplies. Containers should be triple rinsed and offered for recycling, reconditioning, or disposed in approved landfill or buried in a safe place.

Consult Federal, State or local Disposal authorities for approved alternate procedures.

RESTRICTED USE PESTICIDE

FOR RETAIL SALE TO AND APPLICATION ONLY BY CERTIFIED APPLICATORS OR PERSONS UNDER THEIR DIRECT SUPERVISION

DE PESTO

INSECTICIDE
EMULSIFIABLE CONCENTRATE

ACTIVE INGREDIENT: pestoff—tri-salicylic acid	45.0%
INERT INGREDIENTS:	55.0%
TOTAL:	100.0%

THIS PRODUCT CONTAINS 4.0 LBS OF PESTOFF PER GALLON

KEEP OUT OF REACH OF CHILDREN

DANGER — POISON

STATEMENT OF PRACTICAL TREATMENT

IF SWALLOWED - Induce vomiting by giving a tablespoonful of salt in a glass of warm water. Repeat until vomitus is clear. Call a physician immediately.

IF INHALED - Remove to fresh air. Call a physician immediately.

IF IN EYES - Flush eyes with plenty of water for at least 15 minutes. Call a physician immediately.

IF ON SKIN - In case of contact, remove contaminated clothing and immediately wash skin with detergent and water.

SEE SIDE PANEL FOR ADDITIONAL PRECAUTIONARY STATEMENTS

MFG BY A-Z CHEMICALS
TOWN, STATE

EPA EST. NO. 1357–STATE–1
EPA REGISTRATION NO. 1357-42

NET CONTENTS ONE GALLON

DIRECTIONS FOR USE CONTINUED

METHODS OF APPLICATION: The minimum gallonage requirement is 10 gallons of finished spray per acre with ground equipment, 2 gallons per acre with aircraft.

ALFALFA: Air and Ground Application—Alfalfa Weevil Larvae, Egyptian Alfalfa Weevil Larvae, Pea Aphid, and in New York state for Snout Beetle control. Apply the amount of De Pesto indicated in the chart, when feeding is noticed or when insects appear. Alfalfa Weevil Adult—Apply 1-2 pints per acre when insects appear. Lygus Bugs—Apply 2 pints per acre prior to bloom. Observe the indicated number of days after application before cutting or grazing. Do not apply more than once per season. Apply only to field planted to pure stands of Alfalfa.

Pints of De Pesto Per Acre	Do Not Cut or Graze Within
½	7 days
1	14 days
2	28 days

CORN, FIELD: Ground Application—Corn Rootworms—Use 1½ pints of De Pesto per 13,000 linear feet (1 acre with 40 inch spacing). Apply, at planting, as a 7 inch band over the row or inject on each side of the row by mixing with water or liquid fertilizers. When De Pesto is used with liquid fertilizers, mix in the following way making sure that the mixture is physically compatible. Premix 1 part of De Pesto with 2 parts of water. Add this premix to the tank of fertilizer along with rinsings from the premixing container. Maintain agitation in the tank after mixing and during application. Do not mix until ready to use.

SUGARCANE: Sugarcane Borer—Apply 1-1½ pints De Pesto per acre using ground or aerial equipment. Check sugarcane fields weekly, beginning in early June and continuing through August. Make first application only after visible joints form and 5% or more of the plants are infested with young larvae feeding in or under the leaf sheath and which have not bored into the stalks. Repeat whenever field checks indicate the infestation exceeds 5%. Do not apply within 17 days of harvest. Do not use in Hawaii.

ORANGES, LEMONS, GRAPEFRUIT, and TANGELOS in Arizona and California. Air and Ground application—Citrus thrips—Apply De Pesto at ½ to 1 lb. per acre. Use sufficient water to obtain thorough coverage (5 to 15 gals/acre by air). Use the higher rate on severe infestations of thrips. Apply in the early spring before bloom when the new growth is about 3 to 4 inches long. Make additional applications as needed until the new fruit is walnut size. Application at petal fall may be critical to prevent fruit scarring. Applications during mid-summer to protect new growth on young trees are also recommended.

Do not apply within 1 day of harvest. Do not graze livestock in treated orchards for 10 days after treatment.

POTATO: Tuberworm, cabbage looper, aphids, and in areas east of the Mississippi River, leafhoppers and flea beetles. Apply De Pesto at indicated rates when field checks indicate the insect infestation is above 5%. Tuberworm, cabbage looper and aphids—apply ½ to 1 lb. per acre. Leafhopper and flea beetles—apply ½ lb per acre. Do not apply within 14 days of harvest.

ENVIRONMENTAL PROTECTION
UNIT III

ANSWERS TO TEST

1. a. 1
   b. 5
   c. 7
   d. 3
   e. 2
   f. 4
   g. 6
   h. 8

2. Any three of the following:
   a. Place to live
   b. Clean water
   c. Clean air
   d. Food
   e. Clean soil

3. Discussion should include:
   a. Clean water is essential for man and animal
   b. Soil is necessary to grow crops
   c. Clean air to breathe is essential
   d. Bees and other pollinators must be protected
   e. Wildlife is essential for a balance of nature
   f. Recreational areas are desirable for man

4. b, c, d, f

5. Any two of the following:
   a. Cause nature imbalance
   b. Pollute streams and water supply
   c. Pollute crops
   d. Pollute soil
   e. Kill desirable plants
   f. Build up residue in meat animals

6. Explanation should include:

   a. Each animal has a place in the food chain, depending on the type of food it eats

      1) Animals that eat only plants are on the lowest level

      2) Animals which eat plants and animals, including insects, are on the next level

      3) Animals that eat only meat are on the top of the chain

   b. Meat eaters may be poisoned by pesticides by eating other animals that have accumulated pesticides in their bodies

   c. When plants or animals, including insects, in the lower level of the food chain are killed by pesticides, then animals in levels above them may starve

7. a. 2

   b. 3

   c. 1

   d. 4

8. Any three of the following:

   a. Type of pesticide

   b. Movement

   c. Weather conditions

   d. Form of pesticide

   e. Proper dosage

   f. Persistence

   g. Type of pesticide used previously in the sprayer

9. a. Through the food chain when animals eat plants or other animals

   b. By building up to high levels over a period of time when taken in directly and stored in the animal

10. Any three of the following:

   a. Overdose

   b. Runoff by irrigation

   c. Runoff caused by rain

   d. Drift

e. Carelessness

f. Improper disposal of containers

g. Improper disposal of unused chemicals

11. Discussion should include:

    a. Death of natural enemy

    b. Broken food chain

    c. Improper use of chemical

    d. Resistance to chemical

12. a. No. This pesticide is toxic to wildlife

    b. No. This pesticide is toxic to fish

PESTICIDES
UNIT IV

TERMINAL OBJECTIVE

After completion of this unit, the student should be able to match the ways pesticides attack pests to the best method of application; describe situations where short-term, residual, and broad spectrum insecticides and nonselective and selective herbicides should be used; and explain why timing of a herbicide application is important. The student should be able to name factors to consider in good pest control, list factors an applicator must consider when choosing the pesticide, and interpret pesticide labels. This knowledge will be evidenced by scoring eighty-five percent on the unit test.

SPECIFIC OBJECTIVES

After completion of this unit, the student should be able to:

1. Match terms associated with pesticides to the correct definitions.
2. Match the ways pesticides attack pests with the best method of application.
3. Describe a situation where a short-term insecticide should be used.
4. Describe a situation where a residual insecticide should be used.
5. Describe a situation where a broad spectrum insecticide could be used.
6. Distinguish between protectant or preventive pesticides and eradicant pesticides.
7. Describe a situation where a nonselective herbicide would be used.
8. Describe a situation where a selective herbicide would be used.
9. State the differences between preplanting, preemergence, and postemergence.
10. Explain why timing of a herbicide application is important.
11. List types of chemicals used to alter or change normal crop growth processes.
12. List climatic factors affecting pesticide application.
13. List factors an applicator must consider when choosing the appropriate pesticide.
14. Name conditions that would make control of a pest unnecessary.

15. Name factors to consider in good pest control.

16. Match pest control methods to the proper descriptions.

17. Define integrated control.

18. Interpret pesticide labels correctly when given questions on pesticides.

PESTICIDES
UNIT IV

SUGGESTED ACTIVITIES

I. Instructor:

   A. Provide student with objective sheet.

   B. Provide student with information and assignment sheets.

   C. Make transparencies

   D. Discuss terminal and specific objectives.

   E. Discuss information and assignment sheets.

   F. Give test.

II. Student:

   A. Read objective sheet.

   B. Study information sheet and take notes.

   C. Complete assignment sheet.

   D. Take test.

INSTRUCTIONAL MATERIALS

I. Objective sheet

II. Information sheet

III. Transparency masters

   A. TM 1–Ways Pesticides Attack Pests

   B. TM 2–Selective vs Nonselective Herbicide

   C. TM 3–Preemergence and Postemergence

   D. TM 4–Chemicals Which Alter or Change Normal Plant Growth

   E. TM 5–Pest Control Methods

   F. TM 6–Integrated Control

IV. Assignment Sheet #1--Interpret Pesticide Labels

V. Answers to assignment sheet

VI. Test

VII. Answers to test

PESTICIDES
UNIT IV

INFORMATION SHEET

I. Terms and definitions

A. Pesticide--Chemical or other material that will destroy or control a pest or protect something from a pest

B. Stomach poison--Chemical which kills when swallowed

C. Fumigant poison--Chemical which enters the pest in the form of a gas and kills it

D. Contact poison--Chemical which kills when it touches or is touched by the pest

E. Systemic--Pesticide that is taken up by one part of a plant or animal and moved to another section where it acts against a pest

F. Short-term (nonpersistent)--Pesticide that breaks down almost immediately into nontoxic by-products

G. Residual (persistent)--Pesticide that remains in the environment for a fairly long time

H. Broad spectrum (nonselective)--Toxic to a wide range of pests; used when several different pests are a problem

(NOTE: *Short term, residual,* and *broad spectrum* are often used in describing insecticides and miticides.)

I. Surface spray--Pesticide spray which is evenly applied to the outside of the object to be protected

J. Selective--More toxic to some types of plants or animals than to others; usually used to describe a particular type of pesticide

Example: A selective herbicide would kill crabgrass in a cornfield but would not injure the corn

K. Nonselective--Toxic to all or most plants or animals of a type; usually used to describe a particular type of pesticide

Example: A nonselective herbicide would kill or injure all plants in the application site but not all insects, animals, or other organisms

L. Protectant (preventive)--Pesticide applied before pests are actually found but where they are expected

- M. Eradicant--Pesticide which kills the pest after it appears
- N. Preplant--Pesticide used before the crop is planted
- O. Preemergence--Pesticide used before crop or weeds appear; may also refer to use after crop emerges or is established but before weeds emerge
- P. Postemergence--Pesticide used after crop or weeds have appeared
- Q. Desiccant--Pesticide which draws moisture from or dries up a plant, plant part, or insect causing it to die
- R. Defoliant--Pesticide which causes the leaves of a plant to drop off
- S. Antitranspirant--Chemical which coats the leaves of plants to reduce water loss
- T. Growth regulator--Pesticide which increases, decreases, or changes the normal growth of a plant
- U. Herbicide--Pesticide used to control unwanted plants
- V. Fungicide--Pesticide used to control fungi which cause molds, rots, and plant diseases
- W. Rodenticide--Chemical used to control rodents such as rats and mice
- X. Nematicide--Chemical used to control nematodes
- Y. Miticide--Chemical used to control mites
- Z. Insecticide--Chemical used to control insects

II. Ways pesticides attack pests and methods of application (Transparency 1)

- A. Stomach poison
  - 1. Used as a bait, surface spray, or dust
  - 2. Must be eaten by the pest
- B. Contact poison
  - 1. Used as a surface spray or dust
  - 2. Must touch or be touched by the pest
- C. Systemic poison--Used as a spray, pour-on, injection, or granule

D. Fumigant poison--Applied as a gas or as a liquid which then vaporizes

(NOTE: A pesticide may kill the pest by touching it or it may have to be swallowed to be effective. Some pesticides kill by being both touched and swallowed. Systemics may be absorbed, injected, or fed into the plant or animal to be protected. When the pest feeds on this plant or animal, it eats the systemic chemical and is killed.)

III. Situations where short-term (nonpersistent) insecticide should be used

A. Insects do not return

B. Long-term exposure could injure nontarget plants or animals

C. Short time until harvest of food crop

D. Short time until slaughter of livestock or poultry

E. In homes and dwellings where people and domestic animals might be exposed

IV. Situations where residual (persistent) insecticide should be used

A. Insects are constant control problem and there will be no environmental hazard

B. Fly control in livestock buildings

C. Soil pesticides

V. Situations where broad spectrum insecticide could be used

A. General purpose or wide range killing

B. Presence of several different kinds of insects

(NOTE: Usually broad spectrum insecticides do not kill all insects; each one varies on the kinds and numbers of insects it controls.)

VI. Protectant versus eradicant pesticides

(NOTE: Usually these terms are associated with fungicide use.)

A. Protectant or preventive--Fungicide designed to prevent the plant from getting the disease

(NOTE: It is applied before the disease gets a start and is very useful when a particular disease or group of diseases are likely to attack a plant or crop year after year. Protectants have often been used as routine precautions on fruit and vegetable crops.)

INFORMATION SHEET

B. Eradicant--Fungicide which kills the disease after it appears in or on the plant

(NOTE: Eradicants are less common than protectants because once the fungus is established on the plant, it causes damage and is often difficult to get rid of. Eradicants are often used when protectants are not available, are not applied in time, or are too expensive. They are also applied when a disease appears unexpectedly on a plant or in an area. Eradicants are often used on fruits and vegetables when the protectant spray was not applied in time.)

VII. Situation where nonselective herbicide would be used--To kill all the plants in the area (Transparency 2)

Examples: Clearing under guardrails and fences; total control of weeds in industrial areas

VIII. Situation where selective herbicide would be used--To kill some plants with little or no injury to other plants (Transparency 2)

Examples: Broadleaf plants are to be killed in cotton; herbicides used postemergence on crops and weeds

IX. Preplanting, preemergence, postemergence (Transparency 3)

(NOTE: The timing of application is important to protect nontarget plants.)

A. Preplanting treatment is made before the crop is planted

B. Preemergence treatment is made before the crop or weeds appear

C. Postemergence treatment is made after the crop or weeds appear

(NOTE: Postemergence applications must be very selective. They must control the weeds but leave the crop unharmed. Often the chemical will be applied postemergence to the crop but preemergence to the weeds.)

X. Importance of timing of herbicide application--Care must be taken to get the job done effectively without hurting desirable plants

(NOTE: Directions on the label state when to apply the herbicide for best results.)

XI. Types of chemicals used to alter or change normal crop growth processes (Transparency 4)

A. Growth regulator

B. Defoliant

C. Desiccant

D. Antitranspirant

INFORMATION SHEET

XII. Climatic factors that affect pesticide application

A. Soil moisture

(NOTE: Pesticides work best with moderate soil moisture. Wetness may keep the pesticide from contacting the soil particles.)

B. Rain

(NOTE: Rain often causes pesticides to leach out of or runoff the application site. It also may wash pesticides off foliage. However, preemergence herbicides and protectant or preventive fungicides are often purposely applied in the rain.)

C. Humidity

(NOTE: Herbicides work best when weeds are growing fast. High humidity and warm temperatures help cause this growth.)

D. Temperature

(NOTE: High temperatures cause some pesticides to evaporate more quickly than is desirable. Low temperatures may slow down or stop the activity of some pesticides.)

E. Light

(NOTE: Light aids in breaking down pesticides.)

XIII. Factors to consider when choosing the appropriate pesticide

A. Is effective against the pest

B. Has directions on the label for the intended use

C. Will not cause injury to the plant or other surface to which it is applied

D. Will cause the least damage to beneficial organisms

E. Will not move off the treated area and persist in the environment to harm fish and wildlife

F. Works well in the machinery available

XIV. Conditions that would make control of a pest unnecessary

A. Damage shows, but the pest which caused it may have left the area or may not be causing any further damage

B. Damage may appear too late in the season to be important

C. Plant disease or insect pests may be present, but damage may not be as great as the cost of the pesticide application

INFORMATION SHEET

XV. Good pest control

A. Use all available methods to keep pest damage below economically harmful levels

B. Damage the environment as little as possible

XVI. Pest control methods (Transparency 5)

(NOTE: Most pest control practices have been used for years.)

A. Resistant variety--Choosing crops, animals, and lumber which resist or are unharmed by pests

B. Biological control--Natural enemies such as parasites, predators, and disease agents are used to control pests, especially insects, mites, and some weeds

(NOTE: The farmer can support the pest's natural enemies by choosing pesticides carefully to avoid injuring the enemies. Releasing more of a pest's natural enemies into the target area can increase this biological control.)

C. Cultural control--Planting, growing, harvesting and tillage practices may help or harm pests

Example: Cultivation is harmful to weeds but may result in the spread of diseases and nematodes

(NOTE: Other cultural practices are crop rotation, time of planting and proper fertilizing.)

D. Mechanical-physical control--Traps, barriers, light, sound, heat, cold, radiation, and electrocution are all used to remove or keep the pests from the area where they are not wanted

E. Sanitation--Removing the source of food or nest site will aid in getting rid of pests

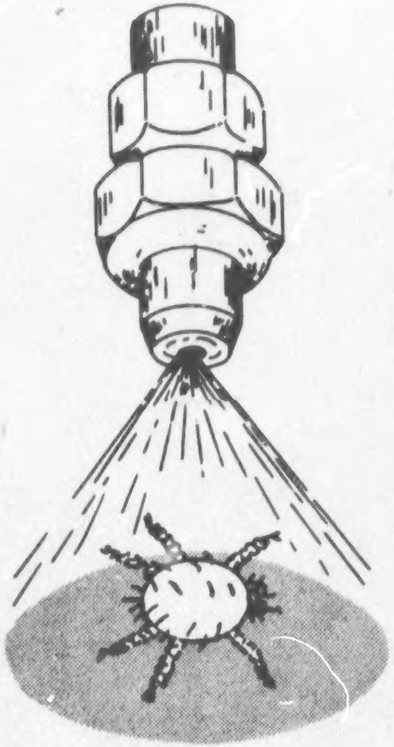
Example: Removing crop residues by plowing

F. Legal control--Includes quarantines, inspections, embargoes, and compulsory crop or product destruction

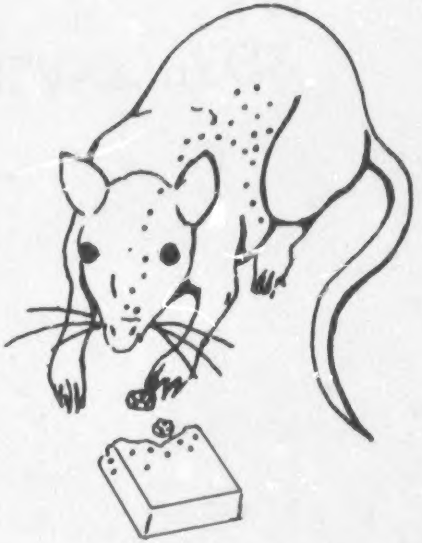
G. Pesticide--Used where no other control method will provide the needed control

XVII. Integrated control--Putting all pest control methods together into a planned program to achieve pest control and protect people and the environment (Transparency 6)

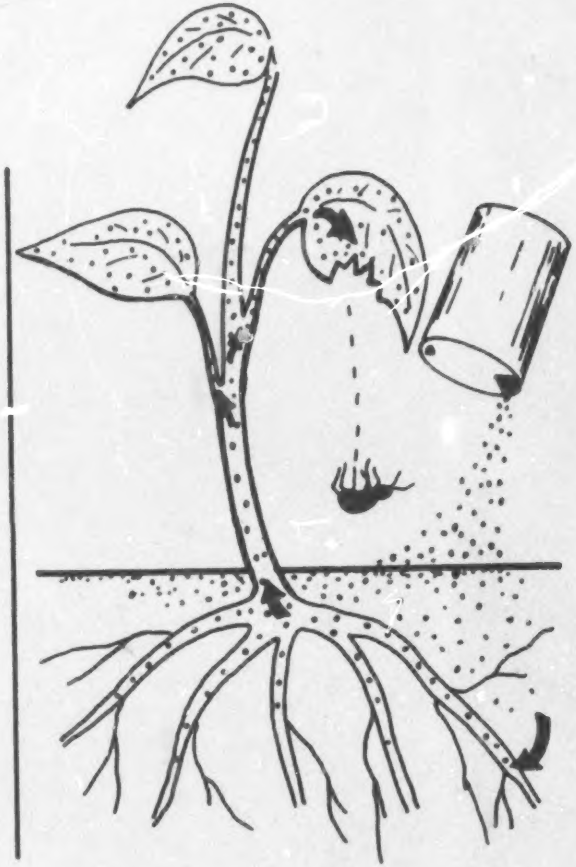
Ways Pesticides Attack Pests



Contact Poison

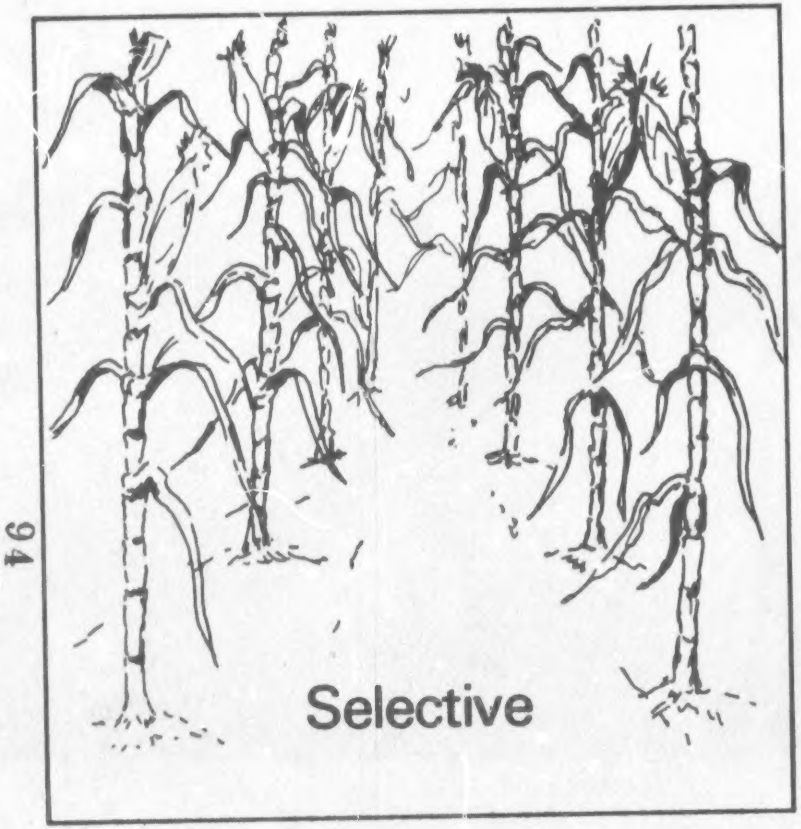


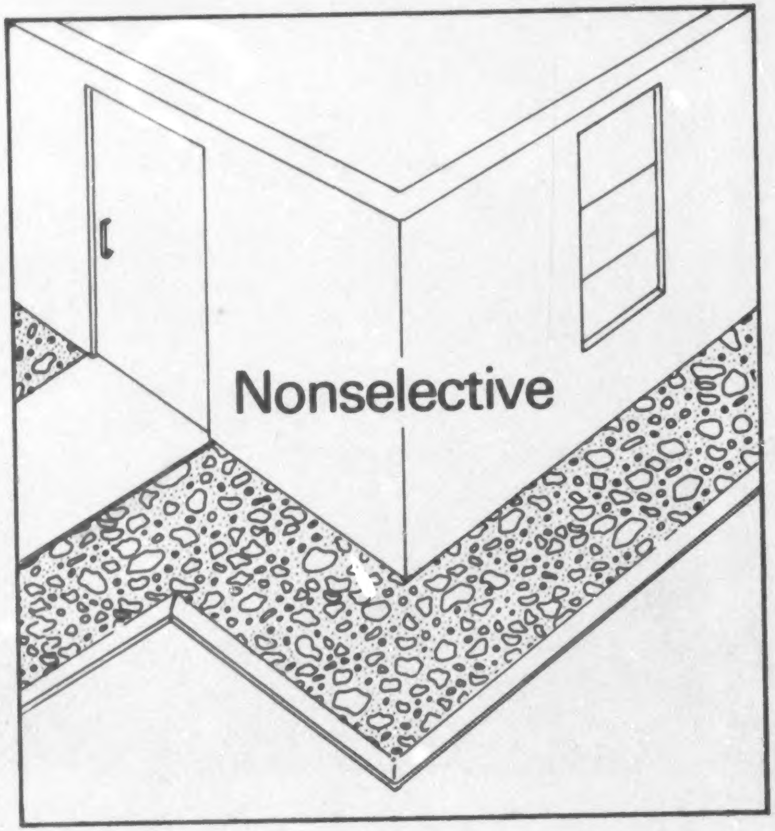
Stomach Poison



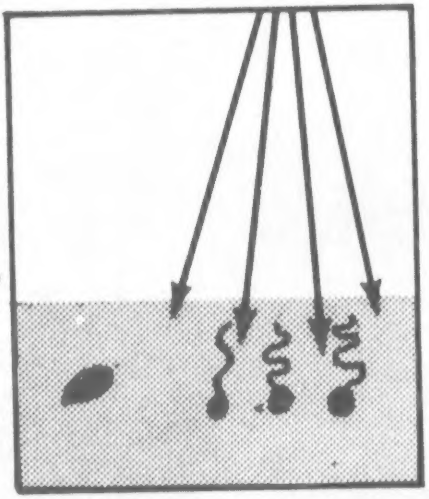
Systemic Poison

Selective vs Nonselective Herbicide

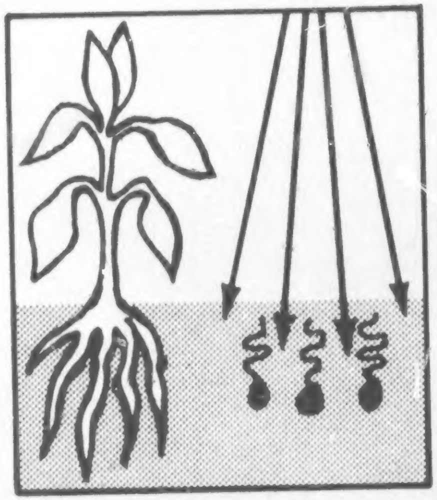



Nonselective

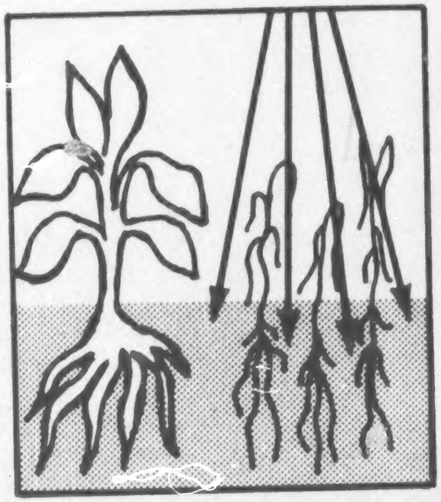
Preemergence and Postemergence



Preemergence to the
Crops and Weeds



Postemerged Crop
Preemerged Weeds

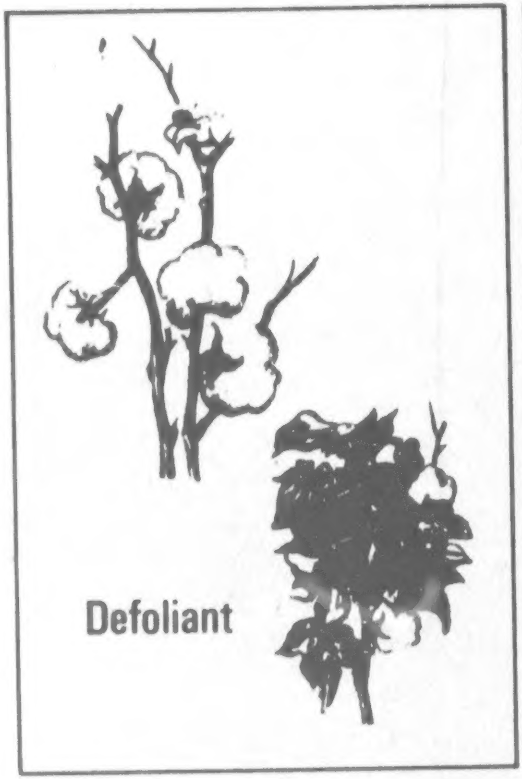


Postemergence to the
Crop and Weeds

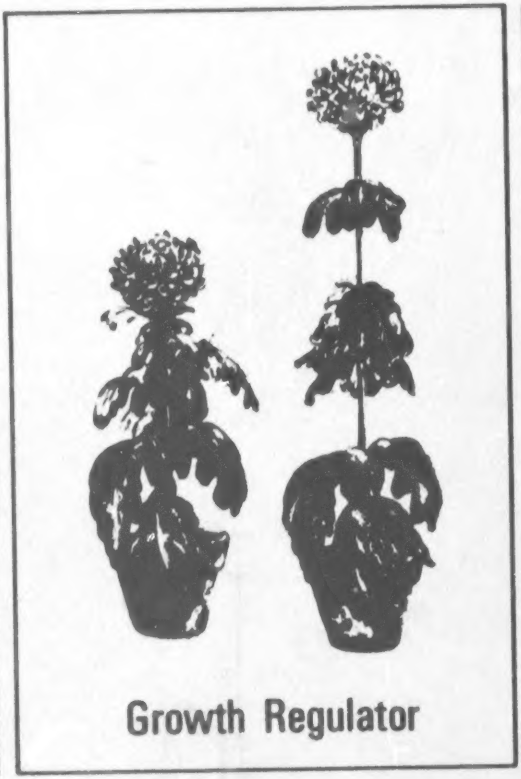
TM 3

TM 4

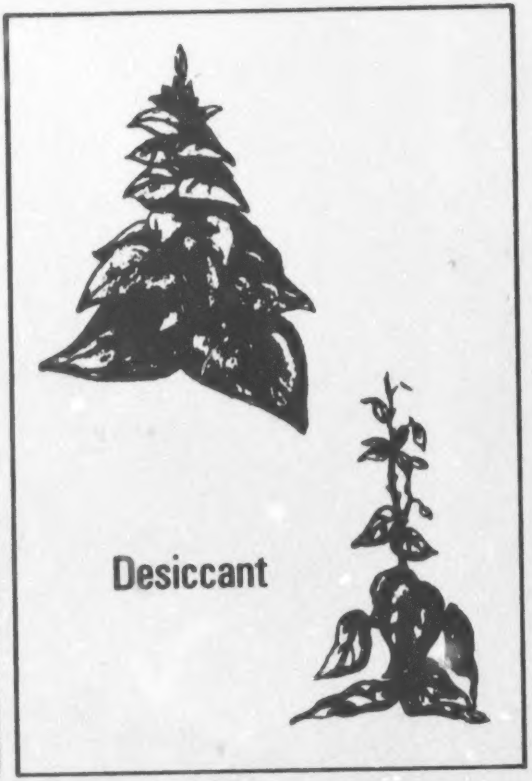
Chemicals Which Alter or Change Normal Plant Growth



Defoliant

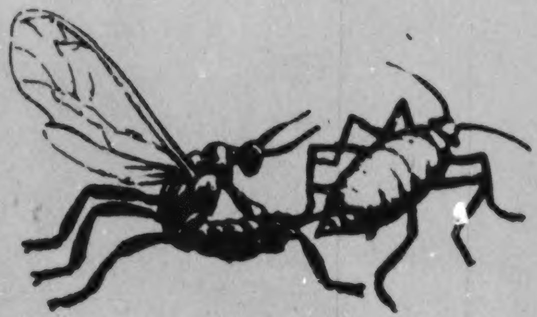


Growth Regulator

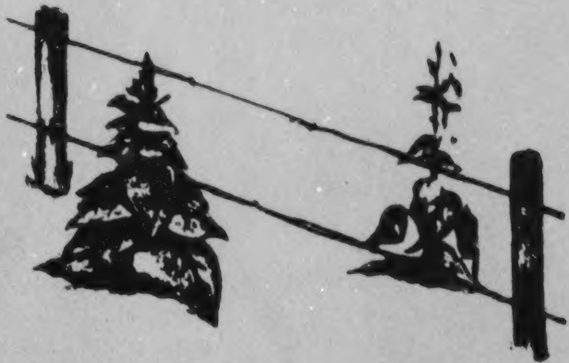


Desiccant

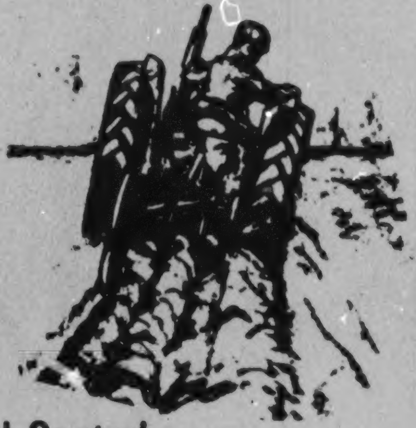
Pest Control Methods



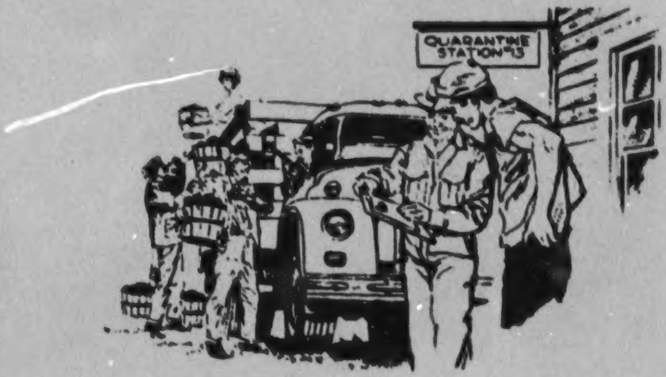
Biological Control



Resistant Varieties

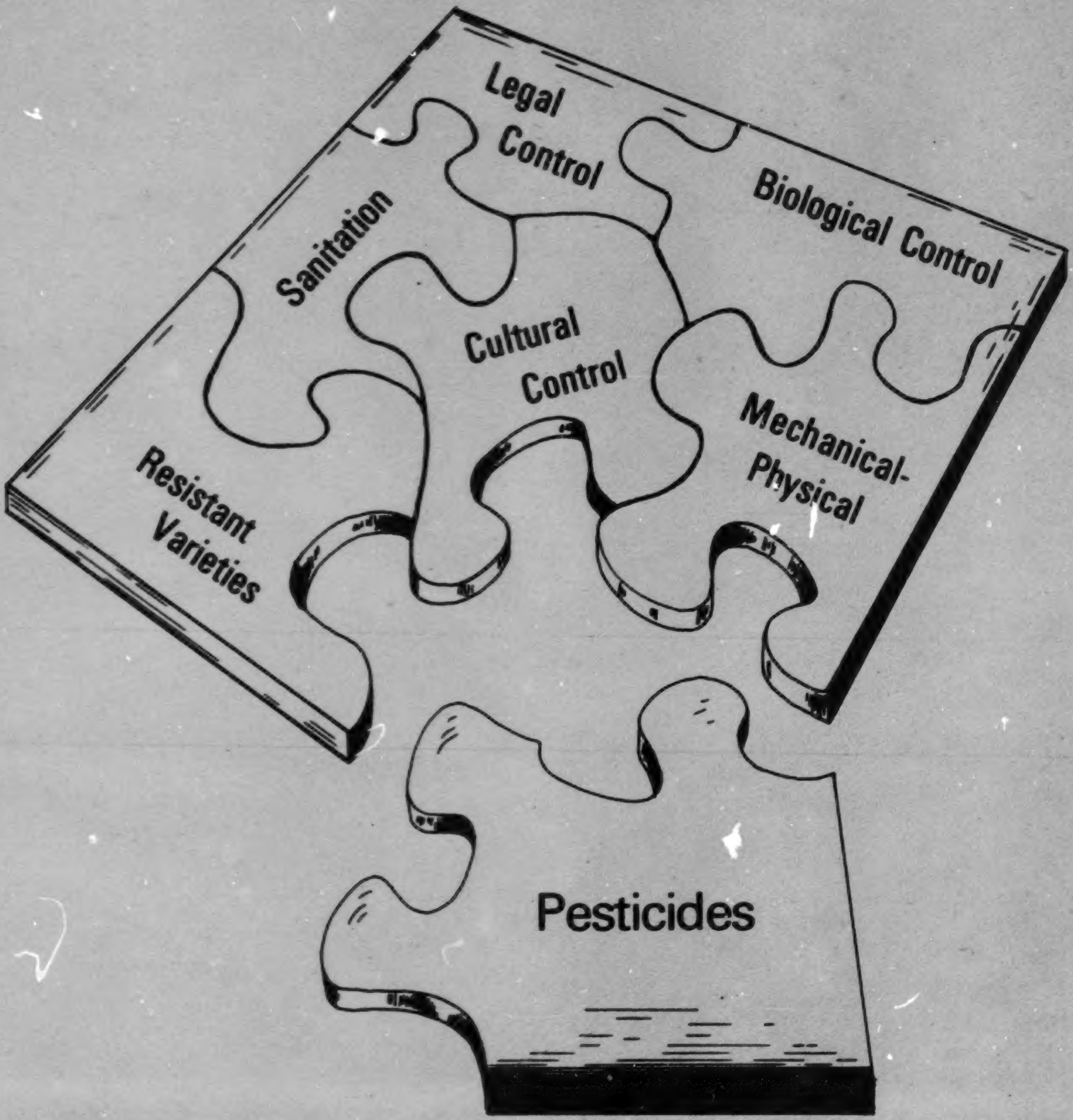


Cultural Control


QUARANTINE STATION #13

Legal Control

Integrated Control


Legal Control
Biological Control
Sanitation
Cultural Control
Mechanical-Physical
Resistant Varieties
Pesticides

PESTICIDES
UNIT IV

ASSIGNMENT SHEET #1–INTERPRET PESTICIDE LABELS

Read the labels provided on the following pages and answer the questions below.

1. Using the De Metho label, answer the following questions.

   a. What type of pesticide is this?

   b. Is this a short-term (nonpersistent) or residual (persistent) pesticide? Why?

   c. Would this broad spectrum pesticide be a good choice if numerous biological controls such as parasites and predators were in the area?

   d. Would it be a good choice if several different kinds of insects were a problem?

2. Using the No-Disease label, answer the following questions.

   a. What type of pesticide is this?

   b. When used as a foliar spray, is it a protectant or preventive spray or an eradicant spray?

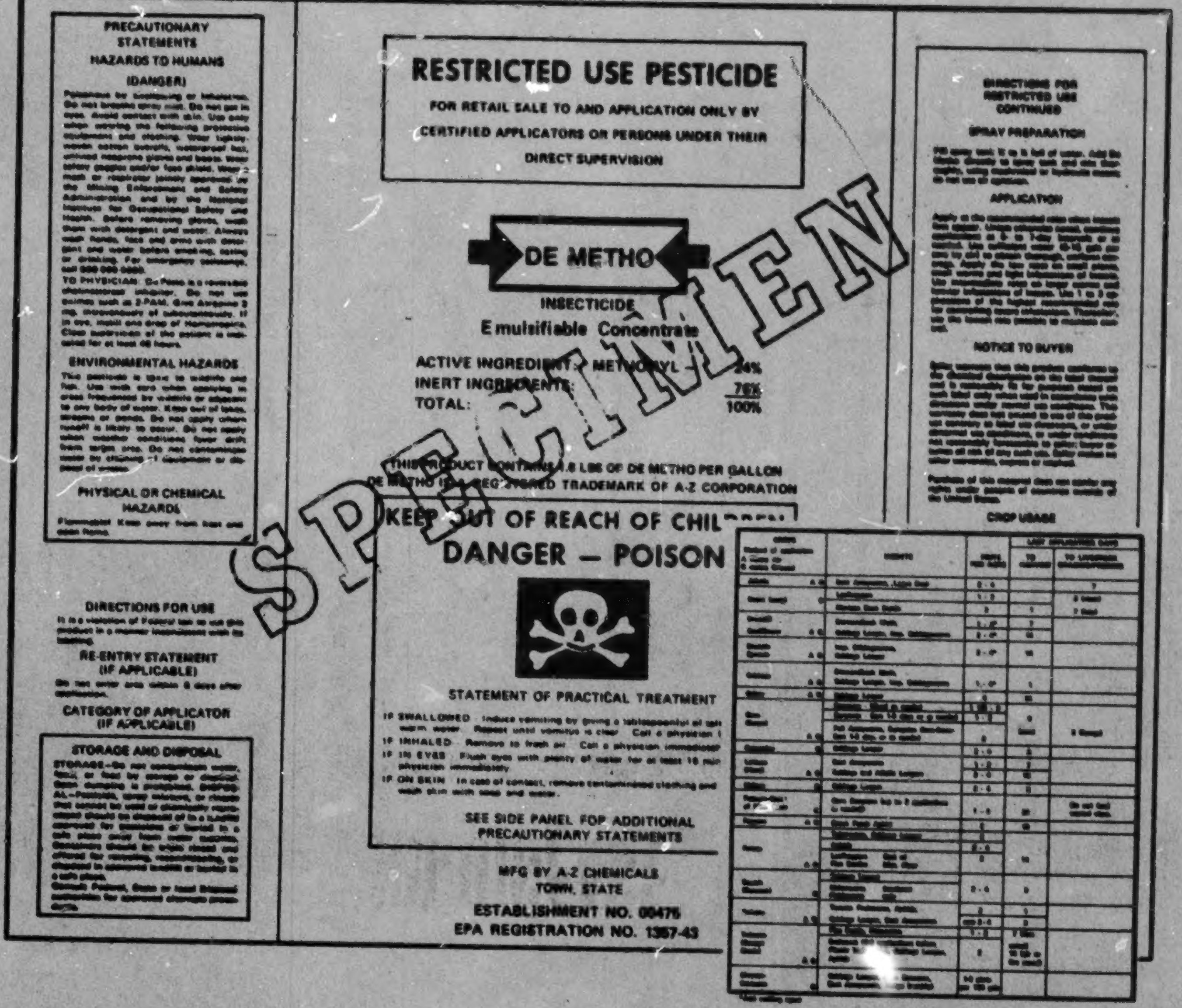
3. Using the Anti-Weed label, answer the following questions.

   a. What type of pesticide is this?

   b. Is this selective or nonselective when used on corn?

   c. Is this used as preplant, preemergence, or postemergence?

ASSIGNMENT SHEET #1



PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS

(DANGER)

TO PHYSICIAN:

ENVIRONMENTAL HAZARDS

PHYSICAL OR CHEMICAL HAZARDS

DIRECTIONS FOR USE

RE-ENTRY STATEMENT (IF APPLICABLE)

CATEGORY OF APPLICATOR (IF APPLICABLE)

STORAGE AND DISPOSAL

RESTRICTED USE PESTICIDE

FOR RETAIL SALE TO AND APPLICATION ONLY BY CERTIFIED APPLICATORS OR PERSONS UNDER THEIR DIRECT SUPERVISION

DE METHO

INSECTICIDE

Emulsifiable Concentrate

ACTIVE INGREDIENT: METHOMYL	24%
INERT INGREDIENTS:	76%
TOTAL:	100%

THIS PRODUCT CONTAINS 1.8 LBS OF DE METHO PER GALLON

DE METHO IS A REGISTERED TRADEMARK OF A-Z CORPORATION

KEEP OUT OF REACH OF CHILDREN

DANGER — POISON

STATEMENT OF PRACTICAL TREATMENT

IF SWALLOWED:

IF INHALED:

IF IN EYES:

IF ON SKIN:

SEE SIDE PANEL FOR ADDITIONAL PRECAUTIONARY STATEMENTS

MFG BY A-Z CHEMICALS
TOWN, STATE

ESTABLISHMENT NO. 00475

EPA REGISTRATION NO. 1357-43

DIRECTIONS FOR RESTRICTED USE CONTINUED

SPRAY PREPARATION

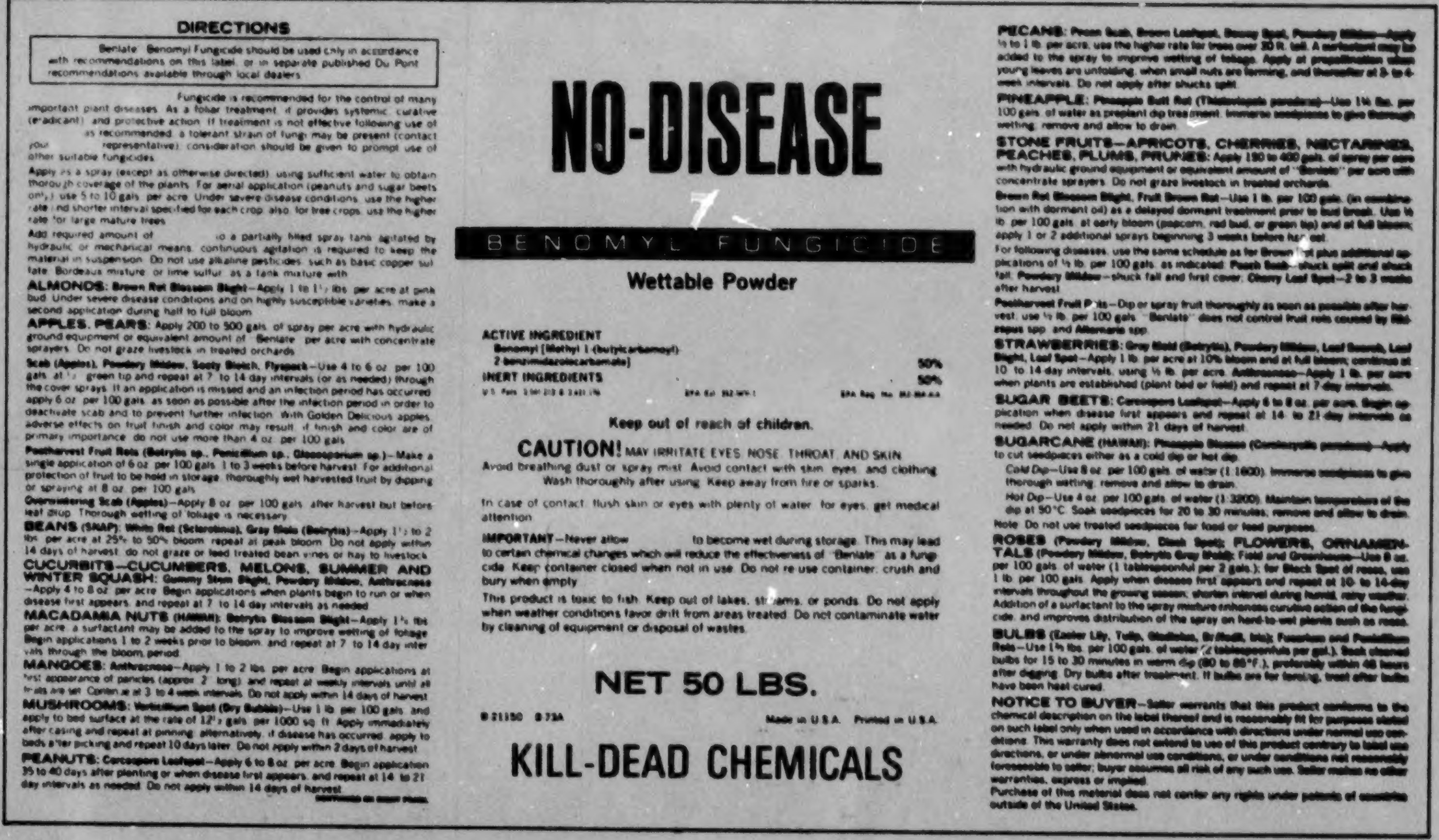
APPLICATION

NOTICE TO BUYER

CROP USAGE

SPECIMEN

ASSIGNMENT SHEET #1



DIRECTIONS

Benlate Benomyl Fungicide should be used only in accordance with recommendations on this label, or in separate published Du Pont recommendations available through local dealers.

Fungicide is recommended for the control of many important plant diseases. As a foliar treatment, it provides systemic, curative (eradicant) and protective action. If treatment is not effective following use of as recommended, a tolerant strain of fungi may be present (contact your representative); consideration should be given to prompt use of other suitable fungicides.

Apply as a spray (except as otherwise directed), using sufficient water to obtain thorough coverage of the plants. For aerial application (peanuts and sugar beets only) use 5 to 10 gals. per acre. Under severe disease conditions, use the higher rate and shorter interval specified for each crop; also, for tree crops, use the higher rate for large mature trees.

Add required amount of to a partially filled spray tank agitated by hydraulic or mechanical means; continuous agitation is required to keep the material in suspension. Do not use alkaline pesticides, such as basic copper sulfate, Bordeaux mixture, or lime sulfur, as a tank mixture with

ALMONDS: Brown Rot Blossom Blight—Apply 1 to 1½ lbs. per acre at pink bud. Under severe disease conditions and on highly susceptible varieties, make a second application during half to full bloom.

APPLES, PEARS: Apply 200 to 500 gals. of spray per acre with hydraulic ground equipment or equivalent amount of "Benlate" per acre with concentrate sprayers. Do not graze livestock in treated orchards.

Scab (Apples), Powdery Mildew, Sooty Blotch, Flyspeck—Use 4 to 6 oz. per 100 gals. at ½" green tip and repeat at 7- to 14-day intervals (or as needed) through the cover sprays. If an application is missed and an infection period has occurred, apply 6 oz. per 100 gals. as soon as possible after the infection period in order to deactivate scab and to prevent further infection. With Golden Delicious apples, adverse effects on fruit finish and color may result; if finish and color are of primary importance, do not use more than 4 oz. per 100 gals.

Postharvest Fruit Rots (Botrytis sp., Penicillium sp., Gloeosporium sp.)—Make a single application of 6 oz. per 100 gals. 1 to 3 weeks before harvest. For additional protection of fruit to be held in storage, thoroughly wet harvested fruit by dipping or spraying at 8 oz. per 100 gals.

Overwintering Scab (Apples)—Apply 8 oz. per 100 gals. after harvest but before leaf drop. Thorough wetting of foliage is necessary.

BEANS (SNAP): White Mold (Sclerotinia), Gray Mold (Botrytis)—Apply 1½ to 2 lbs. per acre at 25% to 50% bloom; repeat at peak bloom. Do not apply within 14 days of harvest; do not graze or feed treated bean vines or hay to livestock.

CUCURBITS—CUCUMBERS, MELONS, SUMMER AND WINTER SQUASH: Gummy Stem Blight, Powdery Mildew, Anthracnose—Apply 4 to 8 oz. per acre. Begin applications when plants begin to run or when disease first appears, and repeat at 7- to 14-day intervals as needed.

MACADAMIA NUTS (HAWAII): Botrytis Blossom Blight—Apply 1½ lbs. per acre; a surfactant may be added to the spray to improve wetting of foliage. Begin applications 1 to 2 weeks prior to bloom, and repeat at 7- to 14-day intervals through the bloom period.

MANGOES: Anthracnose—Apply 1 to 2 lbs. per acre. Begin applications at first appearance of panicles (approx. 2" long) and repeat at weekly intervals until all fruits are set. Continue at 3- to 4-week intervals. Do not apply within 14 days of harvest.

MUSHROOMS: Verticillium Spot (Dry Bubble)—Use 1 lb. per 100 gals. and apply to bed surface at the rate of 12½ gals. per 1000 sq. ft. Apply immediately after casing and repeat at pinning; alternatively, if disease has occurred, apply to beds after picking and repeat 10 days later. Do not apply within 2 days of harvest.

PEANUTS: Cercospora Leafspot—Apply 6 to 8 oz. per acre. Begin application 35 to 40 days after planting or when disease first appears, and repeat at 14- to 21-day intervals as needed. Do not apply within 14 days of harvest.

[illegible]

NO-DISEASE

BENOMYL FUNGICIDE

Wettable Powder

ACTIVE INGREDIENT	
Benomyl [Methyl 1-(butylcarbamoyl)-2-benzimidazolecarbamate]	50%
INERT INGREDIENTS	50%

U.S. Pats. 3,541,213 & 3,631,176 EPA Est. 352-[illegible] EPA Reg. No. [illegible]

Keep out of reach of children.

CAUTION! MAY IRRITATE EYES, NOSE, THROAT, AND SKIN

Avoid breathing dust or spray mist. Avoid contact with skin, eyes, and clothing. Wash thoroughly after using. Keep away from fire or sparks.

In case of contact, flush skin or eyes with plenty of water; for eyes, get medical attention.

IMPORTANT—Never allow to become wet during storage. This may lead to certain chemical changes which will reduce the effectiveness of "Benlate" as a fungicide. Keep container closed when not in use. Do not re-use container; crush and bury when empty.

This product is toxic to fish. Keep out of lakes, streams, or ponds. Do not apply when weather conditions favor drift from areas treated. Do not contaminate water by cleaning of equipment or disposal of wastes.

NET 50 LBS.

®21150 8-73A Made in U.S.A. Printed in U.S.A.

KILL-DEAD CHEMICALS

PECANS: Pecan Scab, Brown Leafspot, Downy Spot, Powdery Mildew—Apply ½ to 1 lb. per acre; use the higher rate for trees over 30 ft. tall. A surfactant may be added to the spray to improve wetting of foliage. Apply at prepollination when young leaves are unfolding, when small nuts are forming, and thereafter at 3- to 4-week intervals. Do not apply after shucks split.

PINEAPPLE: Pineapple Butt Rot (Thielaviopsis paradoxa)—Use 1½ lbs. per 100 gals. of water as preplant dip treatment. Immerse seedpieces to give thorough wetting; remove and allow to drain.

STONE FRUITS—APRICOTS, CHERRIES, NECTARINES, PEACHES, PLUMS, PRUNES: Apply 150 to 400 gals. of spray per acre with hydraulic ground equipment or equivalent amount of "Benlate" per acre with concentrate sprayers. Do not graze livestock in treated orchards.

Brown Rot Blossom Blight, Fruit Brown Rot—Use 1 lb. per 100 gals. (in combination with dormant oil) as a delayed dormant treatment prior to bud break. Use ½ lb. per 100 gals. at early bloom (popcorn, red bud, or green tip) and at full bloom; apply 1 or 2 additional sprays beginning 3 weeks before harvest.

For following diseases, use the same schedule as for Brown Rot plus additional applications of ½ lb. per 100 gals. as indicated: **Peach Scab**—shuck split and shuck fall. **Powdery Mildew**—shuck fall and first cover. **Cherry Leaf Spot**—2 to 3 weeks after harvest.

Postharvest Fruit Rots—Dip or spray fruit thoroughly as soon as possible after harvest; use ½ lb. per 100 gals. "Benlate" does not control fruit rots caused by Rhizopus spp. and Alternaria spp.

STRAWBERRIES: Gray Mold (Botrytis), Powdery Mildew, Leaf Scorch, Leaf Blight, Leaf Spot—Apply 1 lb. per acre at 10% bloom and at full bloom; continue at 10- to 14-day intervals, using ½ lb. per acre. **Anthracnose**—Apply 1 lb. per acre when plants are established (plant bed or field) and repeat at 7-day intervals.

SUGAR BEETS: Cercospora Leafspot—Apply 6 to 8 oz. per acre. Begin application when disease first appears and repeat at 14- to 21-day intervals as needed. Do not apply within 21 days of harvest.

SUGARCANE (HAWAII): Pineapple Disease (Ceratocystis paradoxa)—Apply to cut seedpieces either as a cold dip or hot dip.

Cold Dip—Use 8 oz. per 100 gals. of water (1:1600). Immerse seedpieces to give thorough wetting; remove and allow to drain.

Hot Dip—Use 4 oz. per 100 gals. of water (1:3200). Maintain temperature of the dip at 50°C. Soak seedpieces for 20 to 30 minutes; remove and allow to drain.

Note: Do not use treated seedpieces for food or feed purposes.

ROSES (Powdery Mildew, Black Spot); FLOWERS, ORNAMENTALS (Powdery Mildew, Botrytis Gray Mold): Field and Greenhouse—Use 8 oz. per 100 gals. of water (1 tablespoonful per 2 gals.); for Black Spot of roses, use 1 lb. per 100 gals. Apply when disease first appears and repeat at 10- to 14-day intervals throughout the growing season; shorten interval during humid, rainy weather. Addition of a surfactant to the spray mixture enhances curative action of the fungicide, and improves distribution of the spray on hard-to-wet plants such as roses.

BULBS (Easter Lily, Tulip, Gladiolus, Daffodil, Iris): Fusarium and Penicillium Rots—Use 1½ lbs. per 100 gals. of water (2 tablespoonfuls per gal.). Soak cleaned bulbs for 15 to 30 minutes in warm dip (80 to 85°F.), preferably within 48 hours after digging. Dry bulbs after treatment. If bulbs are for forcing, treat after bulbs have been heat cured.

NOTICE TO BUYER—Seller warrants that this product conforms to the chemical description on the label thereof and is reasonably fit for purposes stated on such label only when used in accordance with directions under normal use conditions. This warranty does not extend to use of this product contrary to label use directions, or under abnormal use conditions, or under conditions not reasonably foreseeable to seller; buyer assumes all risk of any such use. Seller makes no other warranties, express or implied.

Purchase of this material does not confer any rights under patents of countries outside of the United States.

ASSIGNMENT SHEET #1

Anti-Weed

20G

SAMPLE LABEL

Herbicide

FOR WEED CONTROL
IN CORN

50
Pounds
NET WEIGHT

Active Ingredients: 20.0%
Atrazine: 2-chloro-4-Ethylamino-6-isopropylamino-s-triazine . . . 6.32%
Related compounds . . .34%
2-chloro-N-isopropyl-acetanilide . . 13.34%
Inert Ingredients: 80.0%
Total: 100.0%

EPA Reg. No. 1000-519

Anti-Weed 20G is a granular herbicide

Warning:

Keep out of reach of children. See additional warning statements on back of bag.

KILL-DEAD
Chemical Company

ASSIGNMENT SHEET #1

DIRECTIONS FOR USE AND CONDITIONS OF SALE AND WARRANTY

IMPORTANT: Read the entire **Directions For Use** and the **Conditions Of Sale And Warranty** before using this product.

Conditions Of Sale And Warranty

The **Directions For Use** of this product reflect the opinion of experts based on field use and tests. The directions are believed to be reliable and should be followed carefully. However, it is impossible to eliminate all risks inherently associated with use of this product. Crop injury, ineffectiveness or other unintended consequences may result because of such factors as weather conditions, presence of other materials or the manner of use or application all of which are beyond the control of or the Seller. All such risks shall be assumed by the Buyer.

warrants that this product conforms to the chemical description on the label and is reasonably fit for the purposes referred to in the **Directions For Use**, subject to the inherent risks referred to above. **makes no other express or implied warranty of Fitness or Merchantability or any other express or implied warranty.** In no case shall or the Seller be liable for consequential, special or indirect damages resulting from the use or handling of this product. and the Seller offer this product and the Buyer and user accept it, subject to the foregoing **Conditions Of Sale And Warranty** which may be varied only by agreement in writing signed by a duly authorized representative of

General Information

Anti-Weed will control most annual broadleaf and grass weeds in field corn, silage corn and sweet corn. It should be applied prior to weed and crop emergence.

Since Anti-Weed acts mainly through root absorption, its effectiveness depends on rainfall or irrigation to move it into the root zone. Best results are obtained when moisture occurs within 10 days after application. Should moisture not occur within this period or should weeds develop, a shallow cultivation or rotary hoeing will generally result in better weed control.

Anti-Weed is noncorrosive to equipment and metal surfaces, nonflammable and has low electrical conductivity.

Care should be taken to avoid using Anti-Weed where adjacent desirable trees, shrubs or plants might be injured.

Store Anti-Weed in a dry place.

Application Instructions

Broadcast or Overall Treatment

Use broadcast applicators or fertilizer spreaders that can apply small amounts of granules evenly.

Band Treatment

Use applicators designed for this purpose. Calculate the amount of granules per acre needed for band treatment as follows:

$$\frac{\text{Band Width in Inches}}{\text{Inches Between Crop Rows}} \times \begin{array}{l}\text{Recommended}\\ \text{Broadcast Rate}\end{array} = \begin{array}{l}\text{lbs./Acre}\\ \text{Anti-Weed}\\ \text{for Band}\\ \text{Treatment}\end{array}$$

Range of Rates: In each case where a range of rates is given, the lower rate should be used on soils low in organic matter and the higher rate should be used on soils high in organic matter.

Directions for Use

Anti-Weed controls most annual broadleaf and grass weeds such as:

Giant Foxtail
Green Foxtail
Yellow Foxtail
Barnyardgrass
(Watergrass)
Crabgrass

Fall Panicum
Annual Morningglory
Cocklebur
Sandbur
Jimsonweed
Lambsquarters

Mustard
Pigweed
Ragweed
Smartweed
Sunflower
Velvetleaf

Anti-Weed will not control perennial weeds such as:

Johnsongrass Field Bindweed Canada Thistle Bull Nettle

Apply Anti-Weed at planting behind the press wheel or immediately after planting prior to emergence of either crop or weeds. See table below for recommended rates.

Soil	**Rate per acre of Anti-Weed Broadcast**
Light soils: Sands, loamy sands, and sandy loams	15 lbs.
Medium to heavy soils including the dark prairie soils in the Corn Belt**	22.5– 30 lbs.

*For calculation of band treatment rate, see Application Instructions Section.

** Anti-Weed should not be used on high organic soils such as peat and muck.

Suggestions for Crop Rotations

1) Corn may be replanted at any time following application of Anti-Weed . 2) Sorghum may be seeded in all areas the spring following application of the granules. 3) Soybeans may be seeded in Louisiana, Arkansas, Missouri, Iowa and Southeastern Minnesota and areas east of these states the spring following applications made not later than June 1 of the previous year.

Precautions: 1) Do not plant sugar beets, tobacco, vegetables (including dry beans), spring-seeded small grains or small-seeded legumes and grasses the year following Anti-Weed application or injury may occur. 2) Following harvest of a treated crop, plow (moldboard or disk-plow) and thoroughly till the soil in the fall or spring to minimize possible injury to rotational spring-seeded crops. 3) Injury to rotational crops following application may occur on eroded hillsides, alkali outcroppings, gravelly areas and on soils in general with pH near or exceeding 7.5. 4) Do not graze treated area or feed treated forage to livestock for 21 days following application.

Warning

Keep out of reach of children.

Irritating to skin, eyes, nose and throat. May be harmful if swallowed. May cause allergic skin reaction. Do not get in eyes, on skin or on clothing. Avoid breathing dust. Do not take internally. While handling, wear rubber gloves. In case of contact, flush skin or eyes with plenty of water; for eyes, get medical attention. Launder clothing before reuse. Avoid contamination of seed, feed and foodstuffs.

This product is toxic to fish. Keep out of lakes, ponds and streams.

Do not reuse container. Destroy when empty.

PESTICIDES
UNIT IV

ANSWERS TO ASSIGNMENT SHEET

1. a. Insecticide

   b. Relatively short term; because it can be applied fairly close to harvest date and contains no other precautions or persistence

   c. No, it would kill all the beneficial insects also

   d. Yes

2. a. Fungicide

   b. Both

3. a. Herbicide

   b. Selective; kills some weeds but does not harm corn

   c. Preemergence and at planting

PESTICIDES
UNIT IV

TEST

1. Match the terms on the right to the correct definition. (Definitions are continued on the following page.)

______a. Chemical or other material that will destroy or control a pest or protect something from a pest

______b. Chemical which kills when swallowed

______c. Pesticide that is taken up by one part of a plant or animal and moved to another section where it acts against a pest

______d. Pesticide that breaks down almost immediately into nontoxic by-products

______e. Chemical which enters the pest in the form of a gas and kills it

______f. Pesticide that remains in the environment for a fairly long time

______g. Pesticide spray which is evenly applied to the outside of the object to be protected

______h. Chemical which kills when it touches or is touched by the pest

______i. Pesticide applied before pests are actually found but where they are expected

______j. Pesticide which kills the pest after it appears

______k. Pesticide used before the crop is planted

______l. Pesticide used before crop or weeds appear; may also refer to use after crop emerges or is established but before weeds emerge

1. Short-term (nonpersistent)
2. Stomach poison
3. Pesticide
4. Eradicant
5. Preplant
6. Residual (persistent)
7. Defoliant
8. Surface spray
9. Insecticide
10. Fungicide
11. Preemergence
12. Fumigant poison
13. Postemergence
14. Protectant (preventive)
15. Herbicide
16. Desiccant
17. Systemic
18. Rodenticide
19. Contact poison
20. Antitranspirant
21. Nematicide
22. Growth regulator
23. Miticide
24. Nonselective
25. Selective
26. Broad spectrum (nonselective)

______m. Pesticide used after crop or weeds have appeared

______n. Pesticide which draws moisture from or dries up a plant, plant part, or insect causing it to die

______o. Pesticide which causes the leaves of a plant to drop off

______p. Chemical used to control insects

______q. Chemical which coats the leaves of plants to reduce water loss

______r. Pesticide which increases, decreases, or changes the normal growth of a plant

______s. Pesticide used to control unwanted plants

______t. Pesticide used to control fungi which cause molds, rots, and plant diseases

______u. Chemical used to control rodents such as rats and mice

______v. Chemical used to control nematodes

______w. Chemical used to control mites

______x. Toxic to a wide range of pests; used when several different pests are a problem

______y. Toxic to all or most plants or animals of a type; usually used to describe a particular type of pesticide

______z. More toxic to some types of plants or animals than to others; usually used to describe a particular type of pesticide

2. Match the ways a pesticide attacks a pest on the right to the correct method of application.

______a. Used as a bait, surface spray, or dust; must be eaten by the pest

______b. Used as a surface spray or dust; must touch or be touched by the pest

______c. Used as a spray, pour-on, injection, or granule

______d. Applied as a gas or a liquid which then vaporizes

1. Fumigant poison
2. Contact poison
3. Systemic poison
4. Stomach poison

3. Describe a situation where a short-term insecticide should be used.

4. Describe a situation where a residual insecticide should be used.

5. Describe a situation where a broad spectrum insecticide could be used.

6. Distinguish between protectant pesticides (P) and eradicant pesticides (E, by putting a "P" or "E" in the space provided.

    _____a. Fungicide designed to prevent the plant from getting the disease

    _____b. Fungicide which kills the disease after it appears in or on the plant

7. Describe a situation where a nonselective herbicide would be used.

8. Describe a situation where a selective herbicide would be used.

9. State the differences between preplanting, preemergence, and postemergence.

10. Explain why timing of a herbicide application is important.

11. List two types of chemicals used to alter or change normal crop growth processes.

a.

b.

12. List two climatic factors affecting pesticide application.

a.

b.

13. List two factors to consider when choosing the appropriate pesticide.

a.

b.

14. Name two conditions that would make control of a pest unnecessary.

a.

b.

15. Name two factors to consider in good pest control.

a.

b.

16. Match the pest control methods on the right to the correct description.

_____a. Used where no other control method will provide the needed control

_____b. Includes quarantines, inspections, embargoes, and compulsory crop or product destruction

_____c. Removing the source of food or nest site will aid in getting rid of pests

_____d. Traps, barriers, light, sound, heat, cold, radiation, and electrocution are all used to remove or keep the pests from the area where they are not wanted

_____e. Planting, growing, harvesting, and tillage practices may help or harm pests

_____f. Natural enemies such as parasites, predators, and disease agents are used to control pests, especially insects, mites, and some weeds

_____g. Choosing crops, animals, and lumber which resist or are unharmed by pests

1. Resistant variety
2. Biological control
3. Cultural control
4. Mechanical-physical control
5. Sanitation
6. Legal control
7. Pesticide

17. Define integrated control.

18. Interpret the following label by answering the questions below.

a. What type of pesticide is this?

b. Is this selective or nonselective when used at 25 lb/acre rate?

PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS

(CAUTION)

Harmful if swallowed. Avoid application directly to humans. Care should be taken to avoid inhalation of dust or spray mist, or prolonged contact with skin. In case of contact, immediately flush eyes or skin with large amounts of water. Get medical attention if irritation persists. Wear safety goggles or face shield when handling.

ENVIRONMENTAL HAZARDS

Keep out of lakes, streams, or ponds. Do not apply when weather conditions favor drift from target area.

DIRECTIONS FOR USE GENERAL CLASSIFICATION

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

STORAGE AND DISPOSAL

Do not contaminate water, food or feed by storage or disposal. Open dumping is prohibited. Pesticide, spray mixture, or rinsate that cannot be used or chemically reprocessed should be disposed of in a landfill approved for pesticides or buried in a safe place away from water supplies. Containers should be disposed of in an incinerator or landfill approved for pesticide containers, or buried in a safe place. Consult Federal, State, or local disposal authorities for approved alternate procedures such as limited open burning.

DE WEED

HERBICIDE
WETTABLE POWDER

ACTIVE INGREDIENT:	weedout · tri-azoic acid	80.0%
INERT INGREDIENTS:		20.0%
TOTAL:		100.0%

KEEP OUT OF REACH OF CHILDREN

CAUTION

STATEMENT OF PRACTICAL TREATMENT

IF SWALLOWED Induce vomiting
IF INHALED Remove to fresh air.
IF IN EYES Flush eyes with plenty of water
IF ON SKIN Remove clothing and wash with detergent and water.

MFG BY A-Z CHEMICALS
TOWN, STATE

EPA ESTABLISHMENT NO. 1357–STATE–1
EPA REGISTRATION NO. 1357-41

NET WEIGHT FIVE POUNDS

DIRECTIONS FOR USE CONTINUED

DeWeed is for weed control in certain crops, ornamental plantings, on industrial sites, and around-the-farm. It should be applied before weeds emerge or following removal of weed growth. It controls a wide variety of annual broadleaf and grass weeds when used at selective rates in agricultural crops and ornamental plantings. When used at higher, non-selective rates in non crop areas, it also controls many perennial broadleaf and grass weeds.

GROUND APPLICATION: Use conventional spray equipment with 80° flat-fan nozzles. Screens in spray system should be no finer than 50 mesh. Use a pump with capacity to maintain 30-40 psi at nozzles. Use hydraulic or mechanical agitation during mixing and application to maintain a uniform suspension. Aerial application: Use only where specified in the use directions.

BLUEBERRIES and CANEBERRIES (blackberries, boysenberries, loganberries, raspberries)—Quackgrass. Apply 5 lbs per acre in the fall or split the application applying 2½ lbs per acre in the fall plus 2½ lbs per acre in the spring, when quackgrass is growing. Do not apply when fruit is present.

ALFALFA—Pure alfalfa less than one year old (Northeastern U.S. only)—Henbit, wild mustard, chickweed, alyssum, downy brome, wild oats, and pigweed. Pure alfalfa which has been seeded in the spring (before June 1) may be treated in the fall after the last cutting but before frozen ground conditions. Apply 1 lb. of DeWeed per acre. For ground application apply in a minimum of 3½ gals. of water per acre.

GRASSES GROWN FOR SEED (Pacific Northwest only). Perennial ryegrass, tall fescue and fine fescues, such as Pennlawn, Chewings, Ranier, and related species. Control of broadleaf weeds and annual grasses including annual ryegrass, rattail fescue, silver hairgrass and downy brome. Apply 2½ lbs of DeWeed in a minimum of 15 gals of water per acre as soon as fall rains start. Apply only to grasses from which at least one seed crop has been cut.

WEED CONTROL on industrial sites, highway medians, and shoulders, railroad rights-of-way, lumber yards, and in non-crop areas on farms such as around buildings, fuel storage areas, along fences, roadsides, and lanes. Aerial application may be made where it is feasible. Use at least 1 gal of water for each 1 lb. of DeWeed; use more water if practical for both ground and aerial application. To control annual broadleaf and grass weeds (including barnyard grass, cheat, crabgrass, lambsquarters, foxtail, ragweed, puncturevine and mullein), apply 6-12½ lbs. per acre. To control most annual and many perennial broadleaf and grass weeds (including quackgrass, bluegrass, redtop, burdock, Canada thistle, orchardgrass, dogfennel, and plantain), apply 12½-25 lbs. per acre. To control hard-to-kill perennial weeds (including bull thistle and sow thistle), apply 25-50 lbs. per acre.

PESTICIDES
UNIT IV

ANSWERS TO TEST

1.
   - a. 3
   - b. 2
   - c. 17
   - d. 1
   - e. 12
   - f. 6
   - g. 8
   - h. 19
   - i. 14
   - j. 4
   - k. 5
   - l. 11
   - m. 13
   - n. 16
   - o. 7
   - p. 9
   - q. 20
   - r. 22
   - s. 15
   - t. 10
   - u. 18
   - v. 21
   - w. 23
   - x. 26 or 24
   - y. 24 or 26
   - z. 25

2.
   - a. 4
   - b. 2
   - c. 3
   - d. 1

3. Description should include any one of the following:
   - a. Insects do not return
   - b. Long-term exposure could injure nontarget plants or animals
   - c. Short time until harvest of food crop
   - d. Short time until slaughter of livestock or poultry
   - e. In homes and dwellings where people and domestic animals might be exposed

4. Description should include any one of the following:
   - a. Insects are constant control problem and there will be no environmental hazard
   - b. Fly control in livestock buildings
   - c. Soil pesticides

5. Description should include any one of the following:
   a. General purpose or wide range killing
   b. Presence of several different kinds of insects
6. a. P
   b. E
7. To kill all the plants in the area
8. To kill some plants with little or no injury to other plants
9. a. Preplanting treatment is made before the crop is planted
   b. Preemergence treatment is made before the crop or weeds appear
   c. Postemergence treatment is made after the crop or weeds appear
10. Care must be taken to get the job done effectively without hurting desirable plants
11. Any two of the following:
   a. Growth regulator
   b. Defoliant
   c. Desiccant
   d. Antitranspirant
12. Any two of the following:
   a. Soil moisture
   b. Rain
   c. Humidity
   d. Temperature
   e. Light
13. Any two of the following:
   a. Is effective against the pest
   b. Has directions on the label for the intended use
   c. Will not cause injury to the plant or other surface to which it is applied
   d. Will cause the least damage to beneficial organisms
   e. Will not move off the treated area and persist in the environment to harm fish and wildlife
   f. Works well in the machinery available

14. Any two of the following:

    a. Damage shows, but the pest which caused it may have left the area or may not be causing any further damage

    b. Damage may appear too late in the season to be important

    c. Plant disease or insect pests may be present, but damage may not be as great as the cost of the pesticide application

15. a. Use all available methods to keep pest damage below economically harmful levels

    b. Damage the environment as little as possible

16. a. 7

    b. 6

    c. 5

    d. 4

    e. 3

    f. 2

    g. 1

17. Putting all pest control methods together into a planned program to achieve pest control and protect people and the environment

18. a. Herbicide

    b. Nonselective

LABELS AND LABELING
UNIT V

TERMINAL OBJECTIVE

After completion of this unit, the student should be able to match the terms *common name, chemical name,* and *brand name* to the correct definitions and be able to distinguish between general and restricted use pesticides. The student should be able to discuss importance of days to harvest and days to slaughter and name reentry regulations. The student should be able to identify facts contained on pesticide labels and to interpret label information. This knowledge will be evidenced through demonstration and by scoring eighty-five percent on unit test.

SPECIFIC OBJECTIVES

After completion of this unit, the student should be able to:

1. Match terms associated with labels and labeling to the correct definitions.
2. Select from a list statements indicating when to read a label.
3. Match the users of labels to ways the labels are used.
4. Select from a list the agency in the federal government responsible for registering labels.
5. Identify facts contained on a pesticide label.
6. Match the terms *common name, chemical name* and *brand name* to the correct definitions.
7. Match the signal words found on labels to their toxicity categories.
8. Discuss in a short paragraph the importance of days to harvest and days to slaughter in the application of pesticides.
9. Name reentry regulations following application of pesticides.
10. Name the factors that form the basis for pesticide classification.
11. Distinguish between general use and restricted use pesticides.
12. Interpret labels correctly by answering questions pertaining to labels.

LABELS AND LABELING
UNIT V

SUGGESTED ACTIVITIES

I. Instructor:

- A. Provide student with objective sheet.
- B. Provide student with information and assignment sheets.
- C. Discuss terminal and specific objectives.
- D. Discuss information and assignment sheets.
- E. Secure pesticide labels and make available to students.
- F. Give test.

II. Student:

- A. Read objective sheet.
- B. Study information sheet.
- C. Complete assignment sheets.
- D. Take test.

INSTRUCTIONAL MATERIALS

I. Objective sheet

II. Information sheet

III. Transparency masters

- A. TM 1--Future Pesticide Label
- B. TM 2--Existing Pesticide Label
- C. TM 3--Signal Words
- D. TM 4--Days to Harvest
- E. TM 5--Days to Slaughter
- F. TM 6--Reentry Sign
- G. TM 7--Future General Use Pesticide Label
- H. TM 8--Future Restricted Use Pesticide Label

IV. Assignment sheets

  A. Assignment Sheet #1--Interpret Kill-Dead Label
  B. Assignment Sheet #2--Interpret De Metho Label
  C. Assignment Sheet #3--Interpret Anti-Weed Label
  D. Assignment Sheet #4--Interpret No-Disease Label

V. Answers to assignment sheets

VI. Test

VII. Answers to test

LABELS AND LABELING
UNIT V

INFORMATION SHEET

I. Terms and definitions

   A. Active ingredient--That part of a pesticide product which will kill or control pests or prevent damage by them

      (NOTE: This is the actual poison in a product.)

   B. Label--Form of printed material attached to or printed on a pesticide container

   C. Labeling--Technical information in the form of printed material provided by the manufacturer or its agent

   D. Pesticide--Chemical or other material that will destroy or control a pest or protect something from a pest

   E. Pest--Unwanted organism

      (NOTE: An organism may be plant or animal, including bacteria and fungi.)

   F. Poison--Chemical or material that can cause injury or death when eaten, absorbed, or inhaled by plants or animals, including man

   G. Signal words--Words which must appear on pesticide labels to show toxicity of pesticide

   H. Toxic--Poisonous; ability to cause injury to plants and animals, including humans

   I. Reentry--Period of time between a pesticide application and when workers can safely go back into an area without wearing protective clothing or equipment

II. When to read the label

   A. Before use or purchase

   B. Before mixing

   C. Before applying

   D. Before storing and disposing

      (NOTE: Surely, if it costs millions of dollars to develop, the label is worth reading.)

INFORMATION SHEET

III. Users of labels and ways labels are used

  A. Federal and state governments--Use labels to control sale, use, safety, storage, and disposal of pesticides

  B. Manufacturers of pesticides--Use the label as the license to sell a pesticide

  (NOTE: Until the label is registered the pesticide may not be sold or used.)

  C. Buyers and users

    1. Use label as a way of deciding which pesticide will be effective against the pest and be the safest to use

    2. Use label to decide what safety precautions to take and how much pesticide to use

    (NOTE: Some labels are easy to understand. Others are complicated. However, all labels tell you how to use the product correctly.)

  D. Physicians--Use label to determine the antidote to use in the proper treatment of poisoning cases

IV. Agency in the federal government responsible for registering labels--Environmental Protection Agency (EPA)

(NOTE: Most states also register pesticides.)

V. Facts contained on pesticide label (Transparency 1)

  A. Name and address of chemical company

  B. Brand (trade) name

  C. Name and amounts of all active ingredients

  (NOTE: The label will also list the amounts of inert ingredients.)

  D. Type of pesticide

  E. Kind of formulation

  F. EPA registration and establishment numbers

  G. Storage and disposal precautions

  H. Hazard statement

  (NOTE: This statement describes environmental hazards, human hazards, animal and plant hazards, and physical and chemical hazards.)

INFORMATION SHEET

I. Directions for use

J. Net content

VI. Names found on labels (Transparency 2)

A. Brand name--Name used by a manufacturer to identify a pesticide as their product

(NOTE: The brand name may not be used in the ingredient statement but usually appears in large, bold-faced letters on the packaging. One brand name, such as Ortho, may appear on the label of several different kinds of pesticide chemicals.)

B. Common name--Well-known, made-up name accepted by the Environmental Protection Agency to identify the actual poison in a pesticide

(NOTE: The common name must be used in the active ingredients section on the label and is usually not capitalized.)

C. Chemical name--Scientific "often complicated" name which tells what the active ingredients or actual poisons are

(NOTE: When an accepted common name is not available, the chemical name must be used to name the active ingredients in the ingredient section of the label. Often both the chemical name and the common name appear.)

VII. Signal words found on labels (Transparency 3)

A. Danger, Poison, Skull and Crossbones--Highly toxic pesticides

(NOTE: The word *poison* is printed in red.)

B. Warning--Moderately toxic pesticides

C. Caution--Slightly toxic to relatively nontoxic pesticides

VIII. Importance of days to harvest and days to slaughter in the application of pesticides (Transparencies 4 and 5)

A. Residue amounts are determined and safe tolerances are set

B. Least number of days between last pesticide application and harvest or slaughter are determined to remain under tolerance

C. Days to harvest or slaughter are listed on the label

D. Harvest or slaughter should not be attempted before time period is over

(NOTE: It is up to you, the applicator, to help make sure that no illegal residue remains on food crops. Follow label directions carefully. Don't be responsible for seizure of your crops or those of your neighbor.)

INFORMATION SHEET

IX. Reentry regulations (Transparency 6)

- A. Wait at least until the deposit has dried or the dust has settled before reentering the field, even with the least hazardous pesticides
- B. Follow safe reentry times on label
- C. Do not allow workers, children, or other persons to reenter the sprayed area until this time has passed
- D. Wear protective clothing and equipment as called for on the label if reentry must be made before time elapses

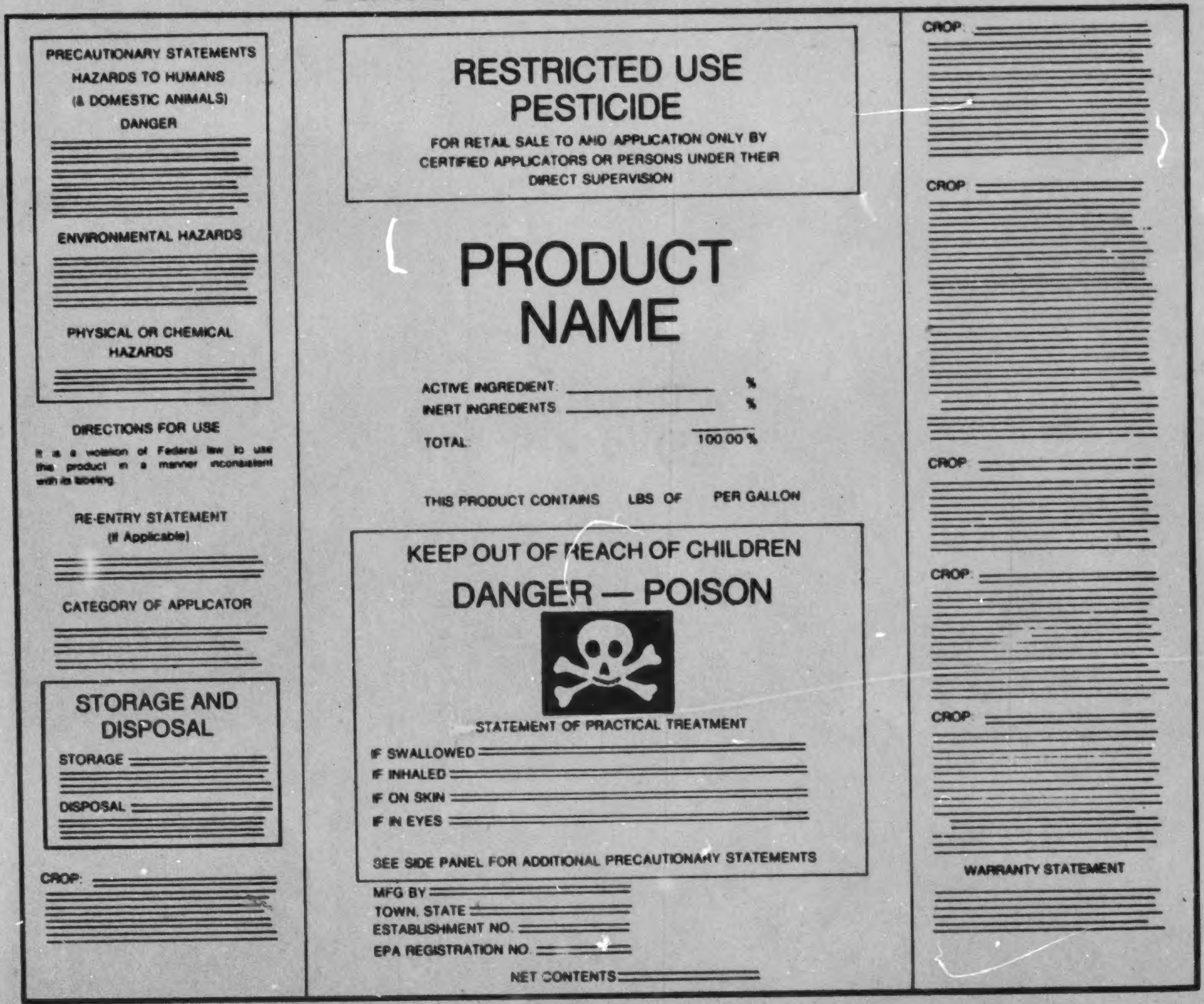
X. Basis for pesticide classification into general use or restricted use pesticides

- A. Hazard of poisoning
- B. Way pesticide is used
- C. Effects on the environment

XI. General use versus restricted use pesticides (Transparencies 7 and 8)

- A. General use--Pesticide use that will not cause excessive damage to the environment or endanger the applicator or other persons when applied according to label directions
- B. Restricted use--Pesticide use that may be a hazard to the environment, the applicator, or other persons even when label directions are followed

Future Pesticide Label



PRECAUTIONARY STATEMENTS
HAZARDS TO HUMANS
(& DOMESTIC ANIMALS)
DANGER

ENVIRONMENTAL HAZARDS

PHYSICAL OR CHEMICAL HAZARDS

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

RE-ENTRY STATEMENT
(If Applicable)

CATEGORY OF APPLICATOR

STORAGE AND DISPOSAL

STORAGE

DISPOSAL

CROP:

RESTRICTED USE PESTICIDE

FOR RETAIL SALE TO AND APPLICATION ONLY BY CERTIFIED APPLICATORS OR PERSONS UNDER THEIR DIRECT SUPERVISION

PRODUCT NAME

ACTIVE INGREDIENT: ____ %
INERT INGREDIENTS ____ %
TOTAL: 100.00 %

THIS PRODUCT CONTAINS LBS OF PER GALLON

KEEP OUT OF REACH OF CHILDREN

DANGER — POISON

STATEMENT OF PRACTICAL TREATMENT

IF SWALLOWED
IF INHALED
IF ON SKIN
IF IN EYES

SEE SIDE PANEL FOR ADDITIONAL PRECAUTIONARY STATEMENTS

MFG BY
TOWN, STATE
ESTABLISHMENT NO.
EPA REGISTRATION NO.
NET CONTENTS

CROP:

CROP:

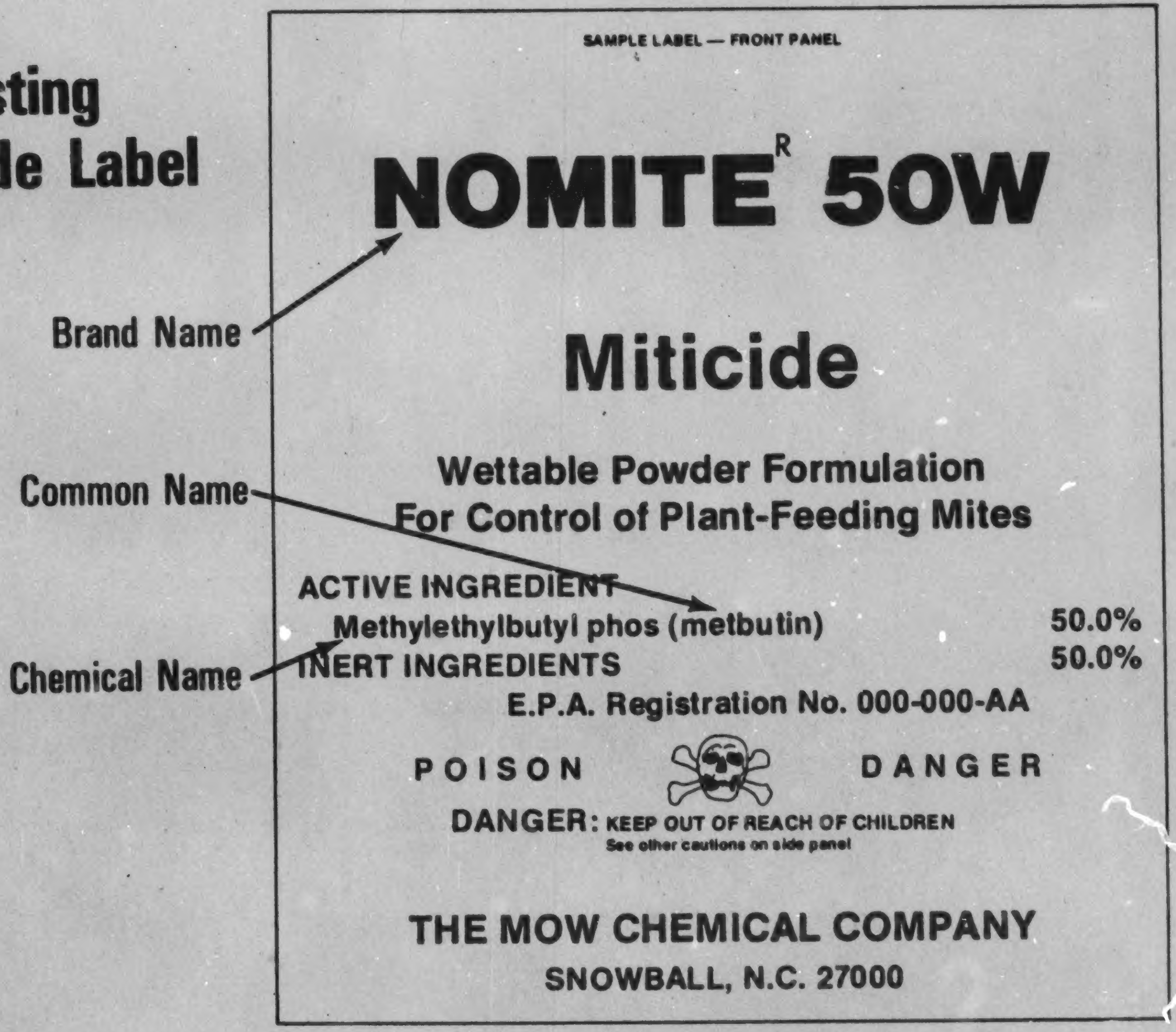
CROP:

CROP:

CROP:

WARRANTY STATEMENT

Existing Pesticide Label



SAMPLE LABEL — FRONT PANEL

NOMITE® 50W

Miticide

Wettable Powder Formulation
For Control of Plant-Feeding Mites

ACTIVE INGREDIENT
Methylethylbutyl phos (metbutin) 50.0%
INERT INGREDIENTS 50.0%

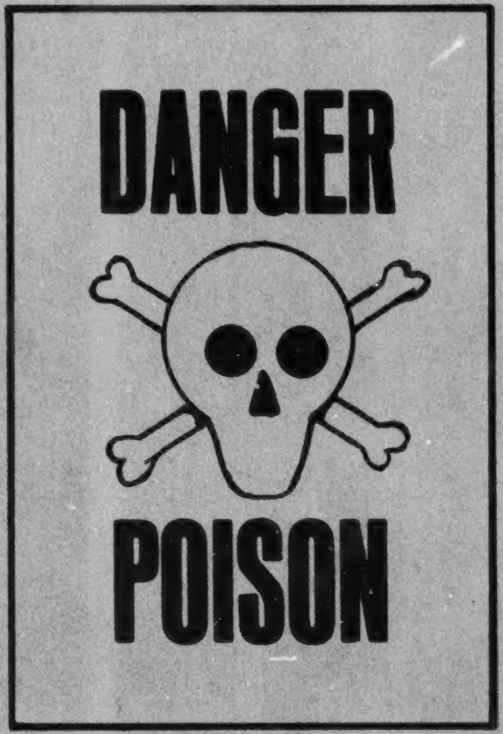
E.P.A. Registration No. 000-000-AA

POISON DANGER

DANGER: KEEP OUT OF REACH OF CHILDREN
See other cautions on side panel

THE MOW CHEMICAL COMPANY
SNOWBALL, N.C. 27000

Signal Words


DANGER
POISON

Highly Toxic

WARNING

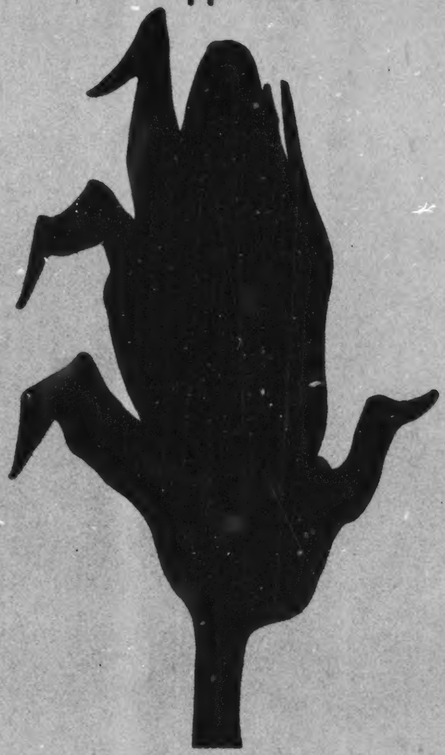
Moderately Toxic

CAUTION

Slightly Toxic to
Relatively Nontoxic

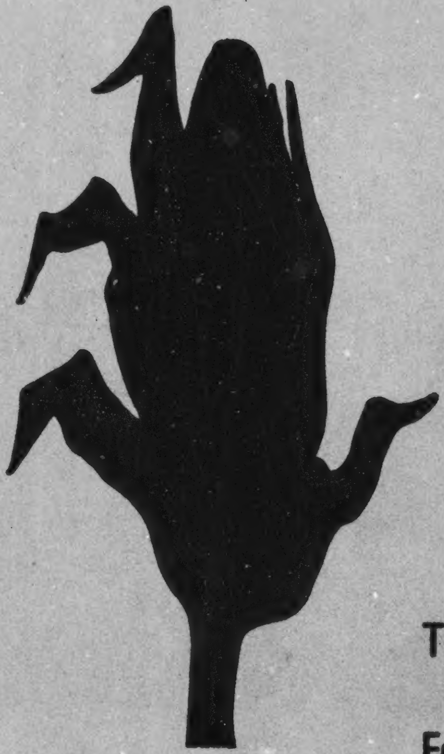
Days to Harvest

10 PPM
0 Days
After Application



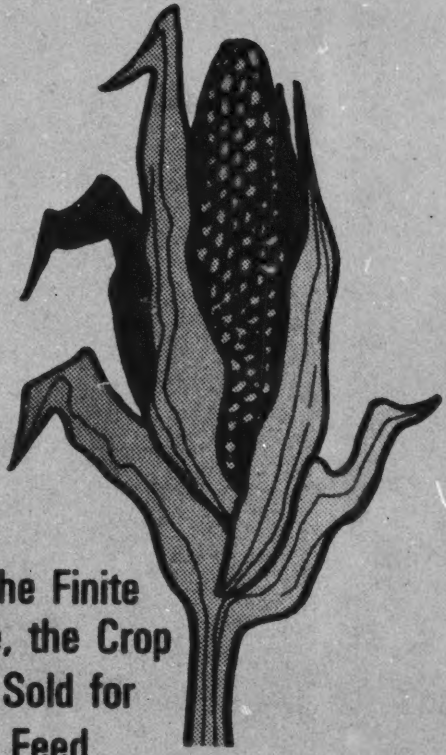
Deposit

6 PPM
4 Days



Residue

2 PPM
Harvest Day



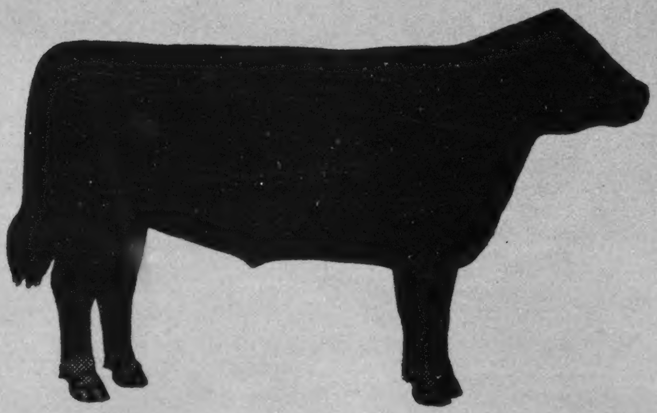
Below the Finite
Tolerance, the Crop
Can be Sold for
Food and Feed

Residue

(Shading Denotes Pesticide Residue)

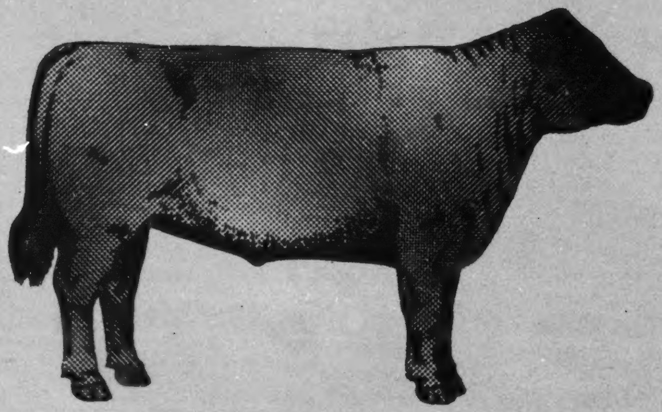
TM 4

Days to Slaughter



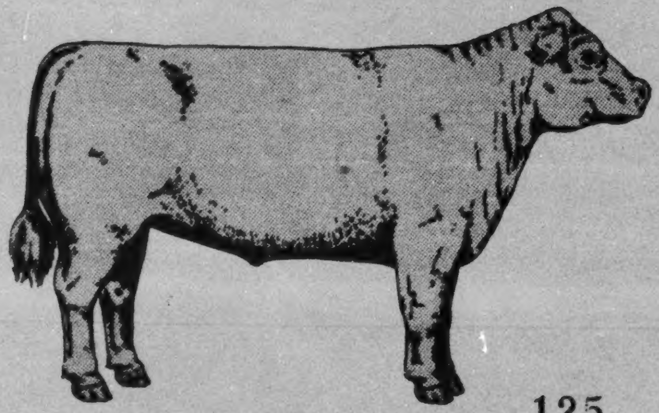
Deposit

Day of Application



Residue

5 Days



Residue

Below Tolerance
Slaughter

(Shading Denotes
Pesticide Residue)

Reentry Sign

DANGER - POISON

Do Not Enter

This Area Until

Wednesday, June 2

Treated With

De Pesto

Future General Use Pesticide Label

PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS

(CAUTION)

Harmful if swallowed. Avoid application directly to humans. Care should be taken to avoid inhalation of dust or spray mist, or prolonged contact with skin. In case of contact, immediately flush eyes or skin with large amounts of water. Get medical attention if irritation persists. Wear safety goggles or face shield when handling.

ENVIRONMENTAL HAZARDS

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DIRECTIONS FOR USE
GENERAL CLASSIFICATION

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STORAGE AND DISPOSAL

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DE WEED

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WETTABLE POWDER

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MFG BY A-Z CHEMICALS
TOWN, STATE

EPA ESTABLISHMENT NO. 1357–STATE–1
EPA REGISTRATION NO. 1357-41

DIRECTIONS FOR USE
CONTINUED

Deweed is for weed control in certain crops, ornamental plantings, on industrial sites, and around-the-farm. It should be applied before weeds emerge or following removal of weed growth. It controls a wide variety of annual broadleaf and grass weeds when used at selective rates in agricultural crops and ornamental plantings. When used at higher, non-selective rates in non crop areas, it also controls many perennial broadleaf and grass weeds.

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BLUEBERRIES and CANEBERRIES (blackberries, boysenberries, loganberries, raspberries)—Quackgrass. Apply 5 lbs per acre in the fall or split the application applying 2½ lbs per acre in the fall plus 2½ lbs per acre in the spring, when quackgrass is growing. Do not apply when fruit is present.

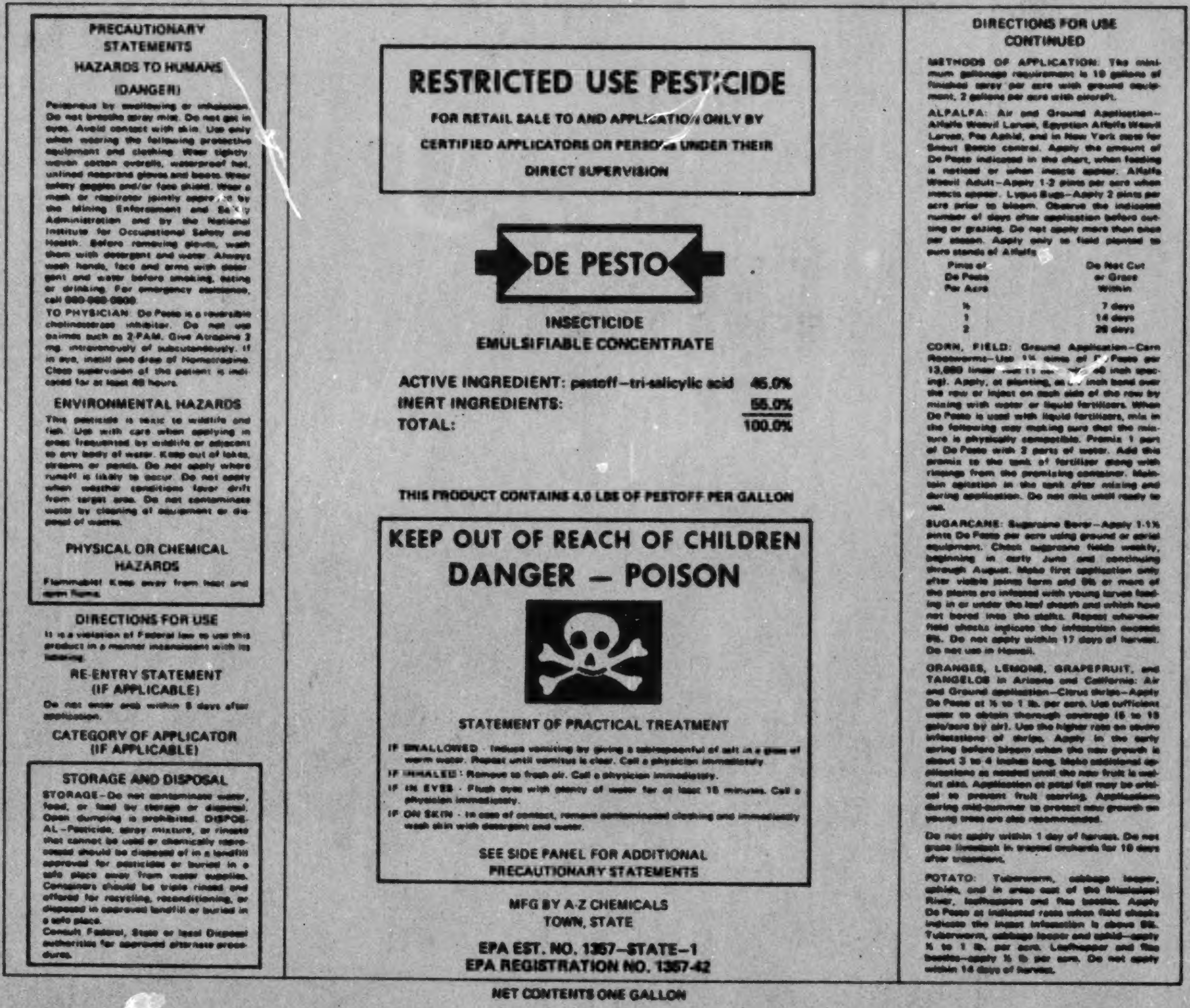
ALFALFA. Pure alfalfa less than one year old (Northeastern U.S. only)—Henbit, wild mustard, chickweed, alyssum, downy brome, wild oats, and pigweed. Pure alfalfa which has been seeded in the spring (before June 1) may be treated in the fall after the last cutting but before frozen ground conditions. Apply 1 lb. of De Weed per acre. For ground application apply in a minimum of 2½ gals. of water per acre.

GRASSES GROWN FOR SEED (Pacific Northwest only). Perennial ryegrass, tall fescue and fine fescue, such as Pennlawn, Chewings, Ranier, and related species. Control of broadleaf weeds and annual grasses including annual ryegrass, rattail fescue, silver hairgrass and downy brome. Apply 2½ lbs of De Weed ,in a minimum of 15 gals of water per acre as soon as fall rains start. Apply only to grasses from which at least one seed crop has been cut.

WEED CONTROL on industrial sites, highway medians, and shoulders, railroad rights-of-way, lumber yards, and in non-crop areas on farms such as around buildings, fuel storage areas, along fences, roadsides, and lanes. Aerial application may be made where it is feasible. Use at least 1 gal of water for each 1 lb. of De Weed; use more water if practical for both ground and aerial application. To control annual broadleaf and grass weeds (including barnyard grass, cheat, crabgrass, lambsquarters, foxtail, ragweed, puncturevine and mullein), apply 6-12½ lbs. per acre. To control most annual and many perennial broadleaf and grass weeds (including quackgrass, bluegrass, redtop, burdock, Canada thistle, orchardgrass, dogfennel, and plantain), apply 12½-25 lbs. per acre. To control hard-to-kill perennial weeds (including bull thistle and sow thistle), apply 25-50 lbs. per acre.

NET WEIGHT FIVE POUNDS

Future Restricted Use Pesticide Label



PRECAUTIONARY STATEMENTS
HAZARDS TO HUMANS
(DANGER)

Poisonous by swallowing or inhalation. Do not breathe spray mist. Do not get in eyes. Avoid contact with skin. Use only when wearing the following protective equipment and clothing. Wear tightly woven cotton overalls, waterproof hat, unlined neoprene gloves and boots. Wear safety goggles and/or face shield. Wear a mask or respirator jointly approved by the Mining Enforcement and Safety Administration and by the National Institute for Occupational Safety and Health. Before removing gloves, wash them with detergent and water. Always wash hands, face and arms with detergent and water before smoking, eating or drinking. For emergency assistance, call 000-000-0000.

TO PHYSICIAN: De Pesto is a reversible cholinesterase inhibitor. Do not use oximes such as 2-PAM. Give Atropine 2 mg. intravenously or subcutaneously. If in eye, instill one drop of Homatropine. Close supervision of the patient is indicated for at least 48 hours.

ENVIRONMENTAL HAZARDS

This pesticide is toxic to wildlife and fish. Use with care when applying in areas frequented by wildlife or adjacent to any body of water. Keep out of lakes, streams or ponds. Do not apply where runoff is likely to occur. Do not apply when weather conditions favor drift from target area. Do not contaminate water by cleaning of equipment or disposal of wastes.

PHYSICAL OR CHEMICAL HAZARDS

Flammable! Keep away from heat and open flame.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

RE-ENTRY STATEMENT (IF APPLICABLE)

Do not enter area within 5 days after application.

CATEGORY OF APPLICATOR (IF APPLICABLE)

STORAGE AND DISPOSAL

STORAGE—Do not contaminate water, food, or feed by storage or disposal. Open dumping is prohibited. DISPOSAL—Pesticide, spray mixture, or rinsate that cannot be used or chemically reprocessed should be disposed of in a landfill approved for pesticides or buried in a safe place away from water supplies. Containers should be triple rinsed and offered for recycling, reconditioning, or disposed in approved landfill or buried in a safe place.

Consult Federal, State or local Disposal authorities for approved alternate procedures.

RESTRICTED USE PESTICIDE

FOR RETAIL SALE TO AND APPLICATION ONLY BY CERTIFIED APPLICATORS OR PERSONS UNDER THEIR DIRECT SUPERVISION

DE PESTO

INSECTICIDE
EMULSIFIABLE CONCENTRATE

ACTIVE INGREDIENT: pestoff—tri-salicylic acid	45.0%
INERT INGREDIENTS:	55.0%
TOTAL:	100.0%

THIS PRODUCT CONTAINS 4.0 LBS OF PESTOFF PER GALLON

KEEP OUT OF REACH OF CHILDREN
DANGER — POISON

STATEMENT OF PRACTICAL TREATMENT

IF SWALLOWED - Induce vomiting by giving a tablespoonful of salt in a glass of warm water. Repeat until vomitus is clear. Call a physician immediately.

IF INHALED: Remove to fresh air. Call a physician immediately.

IF IN EYES - Flush eyes with plenty of water for at least 15 minutes. Call a physician immediately.

IF ON SKIN - In case of contact, remove contaminated clothing and immediately wash skin with detergent and water.

SEE SIDE PANEL FOR ADDITIONAL PRECAUTIONARY STATEMENTS

MFG BY A-Z CHEMICALS
TOWN, STATE

EPA EST. NO. 1357—STATE—1
EPA REGISTRATION NO. 1357-42

NET CONTENTS ONE GALLON

DIRECTIONS FOR USE CONTINUED

METHODS OF APPLICATION: The minimum gallonage requirement is 10 gallons of finished spray per acre with ground equipment, 2 gallons per acre with aircraft.

ALFALFA: Air and Ground Application—Alfalfa Weevil Larvae, Egyptian Alfalfa Weevil Larvae, Pea Aphid, and in New York state for Snout Beetle control. Apply the amount of De Pesto indicated in the chart, when feeding is noticed or when insects appear. Alfalfa Weevil Adult—Apply 1-2 pints per acre when insects appear. Lygus Bugs—Apply 2 pints per acre prior to bloom. Observe the indicated number of days after application before cutting or grazing. Do not apply more than once per season. Apply only to field planted to pure stands of Alfalfa.

Pints of De Pesto Per Acre	Do Not Cut or Graze Within
½	7 days
1	14 days
2	28 days

CORN, FIELD: Ground Application—Corn Rootworms—Use 1½ pints of De Pesto per 13,000 linear feet (1 acre [illegible] 40 inch spacing). Apply, at planting, as a [illegible] inch band over the row or inject on each side of the row by mixing with water or liquid fertilizers. When De Pesto is used with liquid fertilizers, mix in the following way making sure that the mixture is physically compatible. Premix 1 part of De Pesto with 2 parts of water. Add the premix to the tank of fertilizer along with rinsings from the premixing container. Maintain agitation in the tank after mixing and during application. Do not mix until ready to use.

SUGARCANE: Sugarcane Borer—Apply 1-1½ pints De Pesto per acre using ground or aerial equipment. Check sugarcane fields weekly, beginning in early June and continuing through August. Make first application only after visible joints form and 5% or more of the plants are infested with young larvae feeding in or under the leaf sheath and which have not bored into the stalks. Repeat whenever field checks indicate the infestation exceeds 5%. Do not apply within 17 days of harvest. Do not use in Hawaii.

ORANGES, LEMONS, GRAPEFRUIT, and TANGELOS in Arizona and California: Air and Ground application—Citrus thrips—Apply De Pesto at ½ to 1 lb. per acre. Use sufficient water to obtain thorough coverage (5 to 15 gals/acre by air). Use the higher rate on severe infestations of thrips. Apply in the early spring before bloom when the new growth is about 3 to 4 inches long. Make additional applications as needed until the new fruit is walnut size. Application at petal fall may be critical to prevent fruit scarring. Applications during mid-summer to protect new growth on young trees are also recommended.

Do not apply within 1 day of harvest. Do not graze livestock in treated orchards for 10 days after treatment.

POTATO: Tuberworm, cabbage looper, aphids, and in areas east of the Mississippi River, leafhoppers and flea beetles. Apply De Pesto at indicated rates when field checks indicate the insect infestation is above 5%. Tuberworm, cabbage looper and aphids—apply ½ to 1 lb. per acre. Leafhopper and flea beetles—apply ½ lb per acre. Do not apply within 14 days of harvest.

LABELS AND LABELING
UNIT V

ASSIGNMENT SHEET #1–INTERPRET KILL-DEAD LABEL

The purpose of this assignment is to allow you to locate important information that must be contained on all pesticide labels. Read the label on the following page and then answer the questions below. When completed, return assignment sheet to instructor for evaluation.

1. Who was the manufacturer?

2. What is the chemical name of the material?

3. What is the common name of the material?

4. What is the percentage of active ingredients?

5. Which letter(s) on the label identifies approved uses?

6. Which letter(s) on the label identifies first aid treatment?

7. Which letter(s) on the label identifies antidote treatment?

8. Which letter(s) on the label identifies safety precautions?

9. Which letter(s) on the label identifies warnings to user?

10. Which letter(s) on the label identifies timing of application?

ASSIGNMENT SHEET #1

RECOMMENDATIONS FOR USE:

ALFALFA, CLOVER, POTATOES, RICE, SOYBEANS AND VETCH (Seed Crops Only): Use 1/4 pint per acre in sufficient water for uniform coverage to control GRASSHOPPERS, STINKBUGS, TREE HOPPERS, LEAFHOPPERS, COLORADO POTATO BEETLES, POTATO FLEABEETLE & MEXICAN BEAN BEETLE. Use 1/2 pint per acre to control APHIDS and LYGUS BUGS. Repeat as necessary. Do not apply within 30 days of harvest. Do not graze livestock on treated fields or feed treated trash or seed.

CITRUS, Commercial Plantings-For California Use Only (Non-bearing trees only): Use ½ pint per 100 gals. of water to control APHIDS and THRIPS. For the control of MITES, MEALYBUGS and SCALE INSECTS, use 1/2 pint per 100 gals. of water. Apply to give uniform coverage. Repeat as necessary. Do not apply during bloom. To be applied by power operated equipment only. Do not permit spray or spray drift to contact any food or feed crops.

COTTON: For Early Season Control of APHIDS, THRIPS, SPIDER MITES, COTTON FLEAHOPPER & GRASSHOPPERS, use 1/4 pint per acre in sufficient water for uniform c E t. For Mid or Late Season Control of APHIE OTTON LEAFHOPPERS, SPIDER MITES, ASSHOPPERS, BLACK FLEAHOPPER & LYGUS BUG, use 1/2 pint per acre in sufficient water for uniform coverage. Repeat as necessary. Do not apply within 10 days of harvest. Do not graze livestock on treated fields or feed treated gin trash.

WALNUTS, Commercial Plantings - For California Use Only - (non-Bearing trees only): Use 1/2 to 1 pint per 100 gals. water to control APHIDS, MITES & CODLING MOTH. Apply to give uniform coverage. Repeat as necessary. To be applied by power operated equipment only. Do not permit spray or spray drift to contact any food or feed crops.

PRECAUTIONS IN USING: Keep out of the reach of children and domestic animals. Do not contaminate food or feed products. K F y from heat and open flame. To prevent re-use container should be decontaminated and yed. Decontaminate containers by washing thoroughly with strong solution of alkali and detergent and rinse with water. Caution! Avoid skin and eye contamination when handling strong caustic solutions.

NOTICE: The statements made on this label, or any of our agents, are believed to be true and accurate but because of conditions of use which are beyond our control, KILL-DEAD COMPANY does not make, nor does it authorize any agent or representative to make, any warranty, guaranty or representation, express or im G oncerning this material or the use thereof, except th nforms to the chemical description on the label. Ne LL-DEAD COMPANY nor the seller shall be held responsible in any manner for any personal injury or property damage or loss resulting to the buyer or to the other person from handling storage or use of this material, whether or not in accordance with directions. The buyer assumes all risk and liability resulting from such handling, storage or use and accepts and uses this material on these conditions.

DO NOT USE THIS PRODUCT FOR ANY PURPOSE OTHER THAN THAT RECOMMENDED ON THIS LABEL. DO NOT ALLOW THIS PRODUCT TO DRIFT FROM THE AREA BEING TREATED.

DO NOT APPLY DURING PEAK PERIODS OF BEE ACTIVITY.

KILL-DEAD
insecticide

(CONTAINS 8 LB. ACTIVE INGREDIENT PER GALLON)

COMPOSITION:

ACTIVE INGREDIENTS:
Dimethyl phosphate of 3-hydroxy N-N-dimethyl-cis-crotonamide 80%
INERT INGREDIENTS: 20%
100%

DANGER! **KEEP OUT OF REACH OF CHILDREN!**

POISON

POISONOUS IF SWALLOWED, INHALED OR ABSORBED THROUGH SKI A PIDLY ABSORBED THROUGH SKIN. REPEATE HALATION OR SKIN CONTACT MAY, WITHO SYMPTOMS, PROGRESSIVELY INCREASE SUSCEPTIBILITY TO KILL-DEAD POISONING.

See antidote statement & other required warning statements on side panel

KILL-DEAD CHEMICAL CO
SAN LUIS OBISPO CALIFORNIA

D A N G E R!

Do not swallow or get in eyes, on skin, or on clothing. Do not breathe vapors. Wear clean natural rubber gloves, waterproof protective clothing, and goggles. Replace gloves frequently and destroy used gloves. During commercial or prolonged exposure in spray-mixing and loading operations, w mask or respirator of a type adequate against B vapors and gases. Wash thoroughly with so water after handling and before eating or smo . If material gets into the eyes, immediately flush with water for at least ten minutes and get medical attention. In case of accidental flush with water for at least ten minutes and get medical attention. In case of accidental contact, remove all contaminated clothing and wash skin with soap and water; wash clothing before re-use. In case of spillage, wash down with large amounts of water. Decontaminate areas and equipment by washing with concentrated solution of alkali and detergent and rinse with water.

ANTIDOTE AND FIRST AID TREATMENT

ATROPINE IS THE EMERGENCY ANTIDOTE FOR KILL-DEAD POISONING. Consult your physician about obtaining an adequate supply of 1/100-grain tablets for emergency use. ***CALL A PHYSICIAN IN CASE OF SUSPECTED POISONING.***

INTERNAL: If the material has been swallowed, induce vomiting immediately. This may be done by introducing a finger into the throat or by giving warm salt water (1 tablespoon of salt to a glass of water). **NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON.**

EXTERNAL: If the material has been spilled on the skin, immediately remove pa from the vicinity of the KILL-DEAD, remove all C minated clothing, and wash skin with soap and runni er. If the material gets into the eyes, wash immediate running water for at least ten minutes. ***IF WARNING SYMPTOMS APPEAR,*** administer two 1/100-grain atropine tablets immediately. **NEVER ADMINISTER ATROPINE UNLESS WARNING SYMPTOMS APPEAR (See WARNING SYMPTOMS below).** Keep patient prone and quiet. Start artificial respiration at only if patient is not breathing. Transport the patient immediately to the nearest physician.

WARNING SYMPTOMS: Symptoms include weakness, headache, tightness in chest, blurred vision, non-reactive pin-point pupils, salivation, sweating, nausea, vomiting, diarrhea, and abdominal cramps.

TREATMENT: Atropine is the specific therapeutic antagonist of choice against para-sympathetic nervous stimulation. If there are signs of para-sympathetic stimulation, atropine sulfate should be injected at 10-minute intervals, in doses of 2 milligrams, until complete atropinization has occ D Morphine is contraindicated. Clear chest by postural e. Oxygen administration may be necessary. Observe continuously for 48 hours. Repeated exposure to cholinesterase inhibitors may, without warning, cause prolonged susceptibility to very small doses of any cholinesterase inhibitor. Allow no further exposure until time for cholinesterase regeneration has been allowed as determined by blood test.

LABELS AND LABELING
UNIT V

ASSIGNMENT SHEET #2--INTERPRET DE METHO LABEL

The purpose of this assignment is to allow you to locate important information that must be contained on all pesticide labels. Read the label on the next page and answer the questions below. When completed, return assignment sheet to instructor for evaluation.

1. What is the brand name?

2. What is the common name?

3. Why is there no chemical name?

4. When could you allow livestock to graze on the treated alfalfa?

5. How close to harvest could you spray the following crops?

   a. Cauliflower

   b. Tomatoes

6. If you sprayed sweetcorn on Monday, when could you or your workers go back into the field?

7. What is the EPA registration number?

8. What is the EPA establishment number?

9. How much pesticide does this container hold?

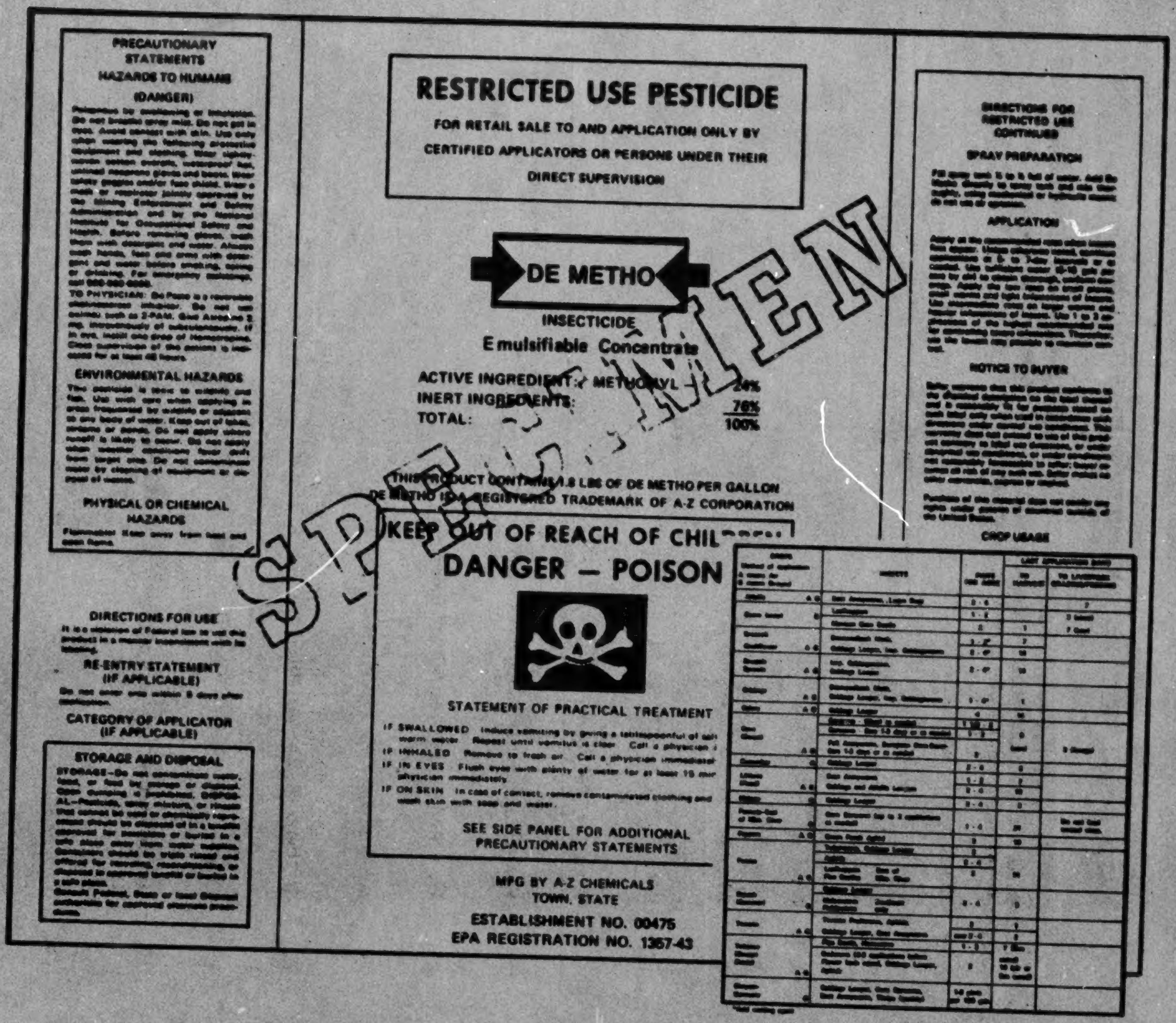
10. What signal words are on this label?

11. For what toxicity category do the signal words stand?

12. Is it a general use or restricted use pesticide?

13. Who could buy this pesticide?

ASSIGNMENT SHEET #2



PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS

(DANGER)

ENVIRONMENTAL HAZARDS

PHYSICAL OR CHEMICAL HAZARDS

DIRECTIONS FOR USE

RE-ENTRY STATEMENT (IF APPLICABLE)

CATEGORY OF APPLICATOR (IF APPLICABLE)

STORAGE AND DISPOSAL

RESTRICTED USE PESTICIDE

FOR RETAIL SALE TO AND APPLICATION ONLY BY CERTIFIED APPLICATORS OR PERSONS UNDER THEIR DIRECT SUPERVISION

DE METHO

INSECTICIDE

Emulsifiable Concentrate

ACTIVE INGREDIENT: METHOMYL	24%
INERT INGREDIENTS:	76%
TOTAL:	100%

THIS PRODUCT CONTAINS 1.8 LBS OF DE METHO PER GALLON

DE METHO IS A REGISTERED TRADEMARK OF A-Z CORPORATION

KEEP OUT OF REACH OF CHIL

DANGER — POISON

STATEMENT OF PRACTICAL TREATMENT

IF SWALLOWED

IF INHALED

IF IN EYES

IF ON SKIN

SEE SIDE PANEL FOR ADDITIONAL PRECAUTIONARY STATEMENTS

MFG BY A-Z CHEMICALS
TOWN, STATE

ESTABLISHMENT NO. 00475
EPA REGISTRATION NO. 1367-43

DIRECTIONS FOR RESTRICTED USE CONTINUED

SPRAY PREPARATION

APPLICATION

NOTICE TO BUYER

CROP USAGE

SPECIMEN

LABELS AND LABELING
UNIT V

ASSIGNMENT SHEET #3--INTERPRET ANTI-WEED LABEL

The purpose of this assignment is to allow you to locate important information that must be contained on all pesticide labels. Read the label on the following page and answer the questions below. When completed, return assignment sheet to instructor for evaluation.

1. Who was the manufacturer?

2. What is the brand name?

3. What is the common name?

4. What is the chemical name?

5. What is the percentage of active ingredients?

6. What are the signal words used on the label?

7. For what toxicity category do the signal words stand?

8. How much pesticide does this container hold?

9. What is the EPA registration number?

10. Is there an EPA establishment number?

11. If you applied this to corn on Monday, when could you reenter the fields?

12. If you applied it on June 1st, when could you graze your livestock in that area?

13. Is this a restricted use or general use pesticide?

14. Is this pesticide flammable or corrosive?

ASSIGNMENT SHEET #3

Anti-Weed

20G

SAMPLE LABEL

Herbicide

FOR WEED CONTROL IN CORN

50 Pounds
NET WEIGHT

Active Ingredients:	20.0%
Atrazine: 2-chloro-4-Ethylamino-6-isopropylamino-s-triazine . . .	6.32%
Related compounds . .	.34%
2-chloro-N-isopropyl-acetanilide . .	13.34%
Inert Ingredients:	80.0%
Total:	100.0%

Anti-Weed 20G is a granular herbicide

Warning:

Keep out of reach of children. See additional warning statements on back of bag.

EPA Reg. No. 1000-519

KILL-DEAD
Chemical Company

ASSIGNMENT SHEET #3

DIRECTIONS FOR USE AND CONDITIONS OF SALE AND WARRANTY

IMPORTANT: Read the entire **Directions For Use** and the **Conditions Of Sale And Warranty** before using this product.

Conditions Of Sale And Warranty

The **Directions For Use** of this product reflect the opinion of experts based on field use and tests. The directions are believed to be reliable and should be followed carefully. However, it is impossible to eliminate all risks inherently associated with use of this product. Crop injury, ineffectiveness or other unintended consequences may result because of such factors as weather conditions, presence of other materials or the manner of use or application all of which are beyond the control of or the Seller. All such risks shall be assumed by the Buyer.

warrants that this product conforms to the chemical description on the label and is reasonably fit for the purposes referred to in the **Directions For Use**, subject to the inherent risks referred to above. **makes no other express or implied warranty of Fitness or Merchantability or any other express or implied warranty.** In no case shall or the Seller be liable for consequential, special or indirect damages resulting from the use or handling of this product. and the Seller offer this product and the Buyer and user accept it, subject to the foregoing **Conditions Of Sale And Warranty** which may be varied only by agreement in writing signed by a duly authorized representative of

General Information

Anti-Weed will control most annual broadleaf and grass weeds in field corn, silage corn and sweet corn. It should be applied prior to weed and crop emergence.

Since Anti-Weed acts mainly through root absorption, its effectiveness depends on rainfall or irrigation to move it into the root zone. Best results are obtained when moisture occurs within 10 days after application. Should moisture not occur within this period or should weeds develop, a shallow cultivation or rotary hoeing will generally result in better weed control.

Anti-Weed is noncorrosive to equipment and metal surfaces, nonflammable and has low electrical conductivity.

Care should be taken to avoid using Anti-Weed where adjacent desirable trees, shrubs or plants might be injured.

Store Anti-Weed in a dry place.

Application Instructions

Broadcast or Overall Treatment

Use broadcast applicators or fertilizer spreaders that can apply small amounts of granules evenly.

Band Treatment

Use applicators designed for this purpose. Calculate the amount of granules per acre needed for band treatment as follows:

$$\frac{\text{Band Width in Inches}}{\text{Inches Between Crop Rows}} \times \begin{matrix}\text{Recommended}\\ \text{Broadcast Rate}\end{matrix} = \begin{matrix}\text{lbs./Acre}\\ \text{Anti-Weed}\\ \text{for Band}\\ \text{Treatment}\end{matrix}$$

Range of Rates: In each case where a range of rates is given, the lower rate should be used on soils low in organic matter and the higher rate should be used on soils high in organic matter.

Directions for Use

Anti-Weed controls most annual broadleaf and grass weeds such as:

Giant Foxtail
Green Foxtail
Yellow Foxtail
Barnyardgrass
(Watergrass)
Crabgrass
Fall Panicum
Annual Morningglory
Cocklebur
Sandbur
Jimsonweed
Lambsquarters
Mustard
Pigweed
Ragweed
Smartweed
Sunflower
Velvetleaf

Anti-Weed will not control perennial weeds such as:

Johnsongrass Field Bindweed Canada Thistle Bull Nettle

Apply Anti-Weed at planting behind the press wheel or immediately after planting prior to emergence of either crop or weeds. See table below for recommended rates.

Soil	**Rate per acre of Anti-Weed Broadcast**
Light soils: Sands, loamy sands, and sandy loams	15 lbs.
Medium to heavy soils including the dark prairie soils in the Corn Belt**	22.5– 30 lbs.

*For calculation of band treatment rate, see Application Instructions Section.

** Anti-Weed should not be used on high organic soils such as peat and muck.

Suggestions for Crop Rotations

1) Corn may be replanted at any time following application of Anti-Weed . 2) Sorghum may be seeded in all areas the spring following application of the granules. 3) Soybeans may be seeded in Louisiana, Arkansas, Missouri, Iowa and Southeastern Minnesota and areas east of these states the spring following applications made not later than June 1 of the previous year.

Precautions: 1) Do not plant sugar beets, tobacco, vegetables (including dry beans), spring-seeded small grains or small-seeded legumes and grasses the year following Anti-Weed application or injury may occur. 2) Following harvest of a treated crop, plow (moldboard or disk-plow) and thoroughly till the soil in the fall or spring to minimize possible injury to rotational spring-seeded crops. 3) Injury to rotational crops following application may occur on eroded hillsides, alkali outcroppings, gravelly areas and on soils in general with pH near or exceeding 7.5. 4) Do not graze treated area or feed treated forage to livestock for 21 days following application.

Warning

Keep out of reach of children.

Irritating to skin, eyes, nose and throat. May be harmful if swallowed. May cause allergic skin reaction. Do not get in eyes, on skin or on clothing. Avoid breathing dust. Do not take internally. While handling, wear rubber gloves. In case of contact, flush skin or eyes with plenty of water; for eyes, get medical attention. Launder clothing before reuse. Avoid contamination of seed, feed and foodstuffs.

This product is toxic to fish. Keep out of lakes, ponds and streams.

Do not reuse container. Destroy when empty.

LABELS AND LABELING
UNIT V

ASSIGNMENT SHEET #4--INTERPRET NO-DISEASE LABEL

The purpose of this assignment is to allow you to locate important information that must be contained on all pesticide labels. Read the label on the following page and answer the questions below. When completed, return assignment sheet to instructor for evaluation.

1. What is the brand name?

2. What is the common name?

3. What is the chemical name?

4. How much pesticide does this container hold?

5. If you plan to harvest your beans on Saturday but on Monday notice gray mold, could you spray with this? Why or why not?

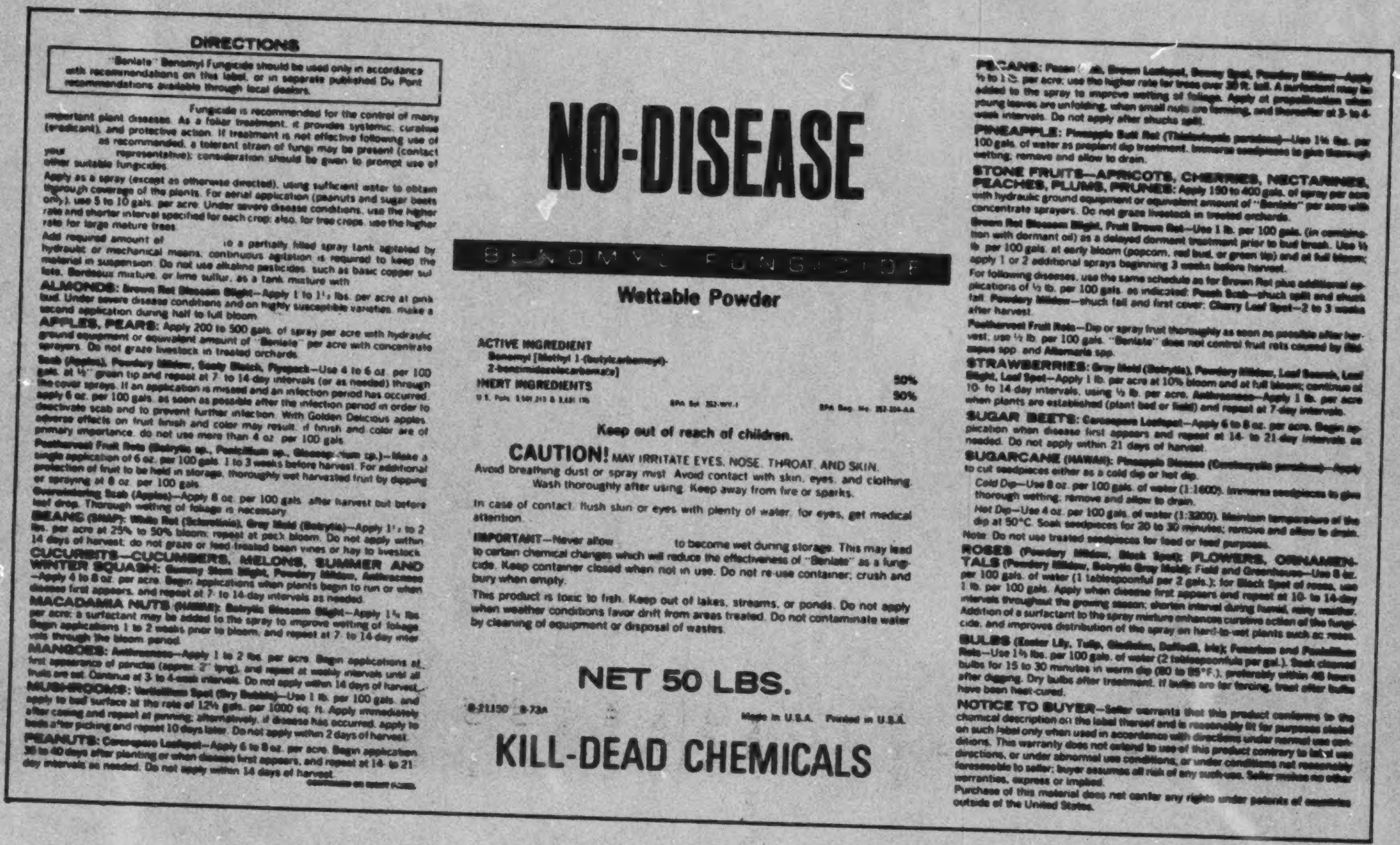
6. How long would you have to wait after spraying to feed your cattle bean vines or hay?

7. When could workers reenter the fields after spraying?

8. What are the signal words on the label?

9. For what toxicity category do the signal words stand?

ASSIGNMENT SHEET #4



DIRECTIONS

"Benlate" Benomyl Fungicide should be used only in accordance with recommendations on this label, or in separate published Du Pont recommendations available through local dealers.

Fungicide is recommended for the control of many important plant diseases. As a foliar treatment, it provides systemic, curative (eradicant), and protective action. If treatment is not effective following use of as recommended, a tolerant strain of fungi may be present (contact your representative); consideration should be given to prompt use of other suitable fungicides.

Apply as a spray (except as otherwise directed), using sufficient water to obtain thorough coverage of the plants. For aerial application (peanuts and sugar beets only), use 5 to 10 gals. per acre. Under severe disease conditions, use the higher rate and shorter interval specified for each crop; also, for tree crops, use the higher rate for large mature trees.

Add required amount of to a partially filled spray tank agitated by hydraulic or mechanical means; continuous agitation is required to keep the material in suspension. Do not use alkaline pesticides, such as basic copper sulfate, Bordeaux mixture, or lime sulfur, as a tank mixture with

ALMONDS: Brown Rot Blossom Blight—Apply 1 to 1½ lbs. per acre at pink bud. Under severe disease conditions and on highly susceptible varieties, make a second application during half to full bloom.

APPLES, PEARS: Apply 200 to 500 gals. of spray per acre with hydraulic ground equipment or equivalent amount of "Benlate" per acre with concentrate sprayers. Do not graze livestock in treated orchards.

Scab (Apples), Powdery Mildew, Sooty Blotch, Flyspeck—Use 4 to 6 oz. per 100 gals. at ¼" green tip and repeat at 7- to 14-day intervals (or as needed) through the cover sprays. If an application is missed and an infection period has occurred, apply 6 oz. per 100 gals. as soon as possible after the infection period in order to deactivate scab and to prevent further infection. With Golden Delicious apples, adverse effects on fruit finish and color may result; if finish and color are of primary importance, do not use more than 4 oz. per 100 gals.

Postharvest Fruit Rots (Botrytis sp., Penicillium sp., Gloeosporium sp.)—Make a single application of 6 oz. per 100 gals. 1 to 3 weeks before harvest. For additional protection of fruit to be held in storage, thoroughly wet harvested fruit by dipping or spraying at 8 oz. per 100 gals.

Overwintering Scab (Apples)—Apply 8 oz. per 100 gals. after harvest but before leaf drop. Thorough wetting of foliage is necessary.

BEANS (SNAP): White Mold (Sclerotinia), Gray Mold (Botrytis)—Apply 1½ to 2 lbs. per acre at 25% to 50% bloom; repeat at peak bloom. Do not apply within 14 days of harvest; do not graze or feed treated bean vines or hay to livestock.

CUCURBITS—CUCUMBERS, MELONS, SUMMER AND WINTER SQUASH: Gummy Stem Blight, Powdery Mildew, Anthracnose—Apply 4 to 8 oz. per acre. Begin applications when plants begin to run or when disease first appears, and repeat at 7- to 14-day intervals as needed.

MACADAMIA NUTS (HAWAII): Botrytis Blossom Blight—Apply 1½ lbs. per acre; a surfactant may be added to the spray to improve wetting of foliage. Begin applications 1 to 2 weeks prior to bloom, and repeat at 7- to 14-day intervals through the bloom period.

MANGOES: Anthracnose—Apply 1 to 2 lbs. per acre. Begin applications at first appearance of panicles (approx. 2" long), and repeat at weekly intervals until all fruits are set. Continue at 3- to 4-week intervals. Do not apply within 14 days of harvest.

MUSHROOMS: Verticillium Spot (Dry Bubble)—Use 1 lb. per 100 gals. and apply to bed surface at the rate of 12½ gals. per 1000 sq. ft. Apply immediately after casing and repeat at pinning; alternatively, if disease has occurred, apply to beds after picking and repeat 10 days later. Do not apply within 2 days of harvest.

PEANUTS: Cercospora Leafspot—Apply 6 to 8 oz. per acre. Begin application 30 to 40 days after planting or when disease first appears, and repeat at 14- to 21-day intervals as needed. Do not apply within 14 days of harvest.

CONTINUED ON RIGHT PANEL

NO-DISEASE

BENOMYL FUNGICIDE

Wettable Powder

ACTIVE INGREDIENT
Benomyl [Methyl 1-(butylcarbamoyl)-2-benzimidazolecarbamate] 50%
INERT INGREDIENTS 50%

U.S. Pats. 3,541,213 & 3,631,176 EPA Est. 352-WV-1 EPA Reg. No. 352-354-AA

Keep out of reach of children.

CAUTION! MAY IRRITATE EYES, NOSE, THROAT, AND SKIN.
Avoid breathing dust or spray mist. Avoid contact with skin, eyes, and clothing. Wash thoroughly after using. Keep away from fire or sparks.

In case of contact, flush skin or eyes with plenty of water; for eyes, get medical attention.

IMPORTANT—Never allow to become wet during storage. This may lead to certain chemical changes which will reduce the effectiveness of "Benlate" as a fungicide. Keep container closed when not in use. Do not re-use container; crush and bury when empty.

This product is toxic to fish. Keep out of lakes, streams, or ponds. Do not apply when weather conditions favor drift from areas treated. Do not contaminate water by cleaning of equipment or disposal of wastes.

NET 50 LBS.

B-21150 9-73A Made in U.S.A. Printed in U.S.A.

KILL-DEAD CHEMICALS

PECANS: Pecan Scab, Brown Leafspot, Downy Spot, Powdery Mildew—Apply ½ to 1 lb. per acre; use the higher rate for trees over 30 ft. tall. A surfactant may be added to the spray to improve wetting of foliage. Apply at prepollination when young leaves are unfolding, when small nuts are forming, and thereafter at 3- to 4-week intervals. Do not apply after shucks split.

PINEAPPLE: Pineapple Butt Rot (Thielaviopsis paradoxa)—Use 1½ lbs. per 100 gals. of water as preplant dip treatment. Immerse seedpieces to give thorough wetting; remove and allow to drain.

STONE FRUITS—APRICOTS, CHERRIES, NECTARINES, PEACHES, PLUMS, PRUNES: Apply 150 to 400 gals. of spray per acre with hydraulic ground equipment or equivalent amount of "Benlate" per acre with concentrate sprayers. Do not graze livestock in treated orchards.

Brown Rot Blossom Blight, Fruit Brown Rot—Use 1 lb. per 100 gals. (in combination with dormant oil) as a delayed dormant treatment prior to bud break. Use ½ lb. per 100 gals. at early bloom (popcorn, red bud, or green tip) and at full bloom; apply 1 or 2 additional sprays beginning 3 weeks before harvest.

For following diseases, use the same schedule as for Brown Rot plus additional applications of ½ lb. per 100 gals. as indicated: Peach Scab—shuck split and shuck fall. Powdery Mildew—shuck fall and first cover. Cherry Leaf Spot—2 to 3 weeks after harvest.

Postharvest Fruit Rots—Dip or spray fruit thoroughly as soon as possible after harvest; use ½ lb. per 100 gals. "Benlate" does not control fruit rots caused by Rhizopus spp. and Alternaria spp.

STRAWBERRIES: Gray Mold (Botrytis), Powdery Mildew, Leaf Scorch, Leaf Blight, Leaf Spot—Apply 1 lb. per acre at 10% bloom and at full bloom; continue at 10- to 14-day intervals, using ½ lb. per acre. Anthracnose—Apply 1 lb. per acre when plants are established (plant bed or field) and repeat at 7-day intervals.

SUGAR BEETS: Cercospora Leafspot—Apply 6 to 8 oz. per acre. Begin application when disease first appears and repeat at 14- to 21-day intervals as needed. Do not apply within 21 days of harvest.

SUGARCANE (HAWAII): Pineapple Disease (Ceratocystis paradoxa)—Apply to cut seedpieces either as a cold dip or hot dip.

Cold Dip—Use 8 oz. per 100 gals. of water (1:1600). Immerse seedpieces to give thorough wetting; remove and allow to drain.

Hot Dip—Use 4 oz. per 100 gals. of water (1:3200). Maintain temperature of the dip at 50°C. Soak seedpieces for 20 to 30 minutes; remove and allow to drain.

Note: Do not use treated seedpieces for food or feed purposes.

ROSES (Powdery Mildew, Black Spot); **FLOWERS, ORNAMENTALS** (Powdery Mildew, Botrytis Gray Mold): Field and Greenhouse—Use 8 oz. per 100 gals. of water (1 tablespoonful per 2 gals.); for Black Spot of roses, use 1 lb. per 100 gals. Apply when disease first appears and repeat at 10- to 14-day intervals throughout the growing season; shorten interval during humid, rainy weather. Addition of a surfactant to the spray mixture enhances curative action of the fungicide, and improves distribution of the spray on hard-to-wet plants such as roses.

BULBS (Easter Lily, Tulip, Gladiolus, Daffodil, Iris): Fusarium and Penicillium Rots—Use 1½ lbs. per 100 gals. of water (2 tablespoonfuls per gal.). Soak cleaned bulbs for 15 to 30 minutes in warm dip (80 to 85°F.), preferably within 48 hours after digging. Dry bulbs after treatment. If bulbs are for forcing, treat after bulbs have been heat-cured.

NOTICE TO BUYER—Seller warrants that this product conforms to the chemical description on the label thereof and is reasonably fit for purposes stated on such label only when used in accordance with directions under normal use conditions. This warranty does not extend to use of this product contrary to label use directions, or under abnormal use conditions, or under conditions not reasonably foreseeable to seller; buyer assumes all risk of any such use. Seller makes no other warranties, express or implied.

Purchase of this material does not confer any rights under patents of countries outside of the United States.

LABELS AND LABELING
UNIT V

ANSWERS TO ASSIGNMENT SHEETS

Assignment Sheet #1

1. Kill-Dead Chemical Co.
2. Dimethyl phosphate of 3-hydroxy N-N-dimethyl-cis-crotonamide
3. None
4. 80%
5. E
6. B, C
7. C, D
8. A, B, F
9. A, B
10. E

Assignment Sheet #2

1. De Metho
2. methomyl
3. Does not have to appear if there is an approved common name
4. Seven days after application
5. a. Up to 14 days before
   b. Up to 1 day at 2 pints/acre or up to 2 days at over 2 pints/acre
6. Saturday (5 days)
7. 1357-43
8. 00475
9. One gallon
10. Danger, Poison, Skull and Crossbones
11. Highly toxic
12. Restricted use
13. Any certified pesticide applicator

Assignment Sheet #3

1. Kill-Dead
2. Anti-Weed
3. atrazine
4. 2-chloro-4-ethylamino-6-isopropylamino-s-triazine
5. 20%
6. Warning
7. Moderately toxic
8. 50 pounds
9. 1000-519
10. No
11. As soon as any dust had settled
12. After June 21st
13. Unable to determine because new label has not yet come out, but the dealer can tell the applicator when he/she goes to buy this pesticide
14. No

Assignment Sheet #4

1. No-Disease
2. benomyl
3. Methyl 1-(butylcarbamoyl)-2-benzimidazolecarbamate
4. 50 lbs
5. No--14 days to harvest
6. Cannot feed the treated bean vines and hay to livestock
7. After the spray has dried on
8. Caution
9. Slightly toxic to relatively nontoxic

LABELS AND LABELING
UNIT V

TEST

1. Match the terms on the right to the correct definitions on the left. Place the appropriate numbers in the blanks provided.

_____a. Poisonous; ability to cause injury to plants and animals, including humans

_____b. Technical information in the form of printed material provided by the manufacturer or its agent

_____c. Chemical or material that can cause injury or death when eaten, absorbed, or inhaled by plants or animals, including man

_____d. Words which must appear on pesticide labels to show toxicity of pesticide

_____e. Form of printed material attached to or printed on a pesticide container

_____f. Unwanted organism

_____g. Chemical or other material that will destroy or control a pest or protect something from a pest

_____h. That part of a pesticide product which will kill or control pests or prevent damage by them

_____i. Period of time between a pesticide application and when workers can safely go back into an area without wearing protective clothing or equipment

1. Label
2. Signal words
3. Pesticide
4. Pest
5. Active ingredient
6. Toxic
7. Labeling
8. Poison
9. Reentry

2. Select from the list below those statements indicating when to read a label. Place an "X" in the appropriate blanks.

_____a. After purchasing the pesticide

_____b. Before mixing

_____c. Before applying

_____d. Before storing and disposing

3. Match the users of the labels on the right to the ways the labels are used on the left. An answer may be used more than once.

_____a. Use labels to control sale, use, safety, storage, and disposal of pesticides

_____b. Use the label as the license to sell a pesticide

_____c. Use label to determine the antidote to use in the proper treatment of poisoning cases

_____d. Use label as a way of deciding which pesticide will be effective against the pest and be the safest to use

_____e. Use label to decide what safety precautions to take and how much pesticide to use

1. State and federal governments
2. Manufacturers of pesticides
3. Buyers and users
4. Physicians

4. Select from the list below the agency in the federal government responsible for registering labels.

_____a. U.S. Department of Agriculture

_____b. State Department of Agriculture

_____c. Environmental Protection Agency

_____d. Environmental Control Agency

5. Identify facts contained on a pesticide label by reading the following label and answering the questions below.

a. What is the brand name?

b. What is the common name?

c. Who is the manufacturer?

d. What is the chemical name?

e. Is the material a wettable powder, granular, or emulsifiable concentrate?

SAMPLE LABEL — FRONT PANEL

NOMITE^{R} 50W

Miticide

Wettable Powder Formulation
For Control of Plant-Feeding Mites

ACTIVE INGREDIENT	
Methylethylbutyl phos (metbutin)	50.0%
INERT INGREDIENTS	50.0%

E.P.A. Registration No. 000-000-AA

POISON **DANGER**

DANGER: KEEP OUT OF REACH OF CHILDREN
See other cautions on side panel

THE MOW CHEMICAL COMPANY
SNOWBALL, N.C. 27000

6. Match the terms on the right to the correct definitions on the left. Place the appropriate numbers in the blanks provided.

______a. Well-known, made-up name accepted by the Environmental Protection Agency to identify the actual poison in a pesticide

______b. Scientific "often complicated" name which tells what the active ingredients or actual poisons are

______c. Name used by a manufacturer to identify a pesticide as their product

1. Brand name
2. Common name
3. Chemical name

7. Match the signal words on the right to the toxicity categories on the left. Place the proper numbers in the blanks provided.

______a. Highly toxic pesticides

______b. Slightly toxic to relatively nontoxic pesticides

______c. Moderately toxic pesticides

1. Caution
2. Warning
3. Danger, Poison, Skull and Crossbones

8. Discuss in a short paragraph the importance of days to harvest and days to slaughter in the application of pesticides.

9. Name reentry regulations following application of pesticides.

a.

b.

c.

d.

10. Name the factors that form the basis for pesticide classification into general use or restricted use pesticides.

a.

b.

c.

11. Distinguish between general use and restricted use pesticides by placing an "X" in the blank indicating general use pesticide.

_____a. Pesticide use that may be a hazard to the environment, the applicator, or other persons even when label directions are followed

_____b. Pesticide use that will not cause excessive damage to the environment or endanger the applicator or other persons when applied according to label directions

12. Interpret the De Pesto label by answering the following questions.

a. What is the common name?

b. If you applied this to control lygus bugs in alfalfa, how long would you have to wait before cutting or grazing?

c. How close to harvest could you spray potatoes?

d. If you sprayed corn on Wednesday, when could workers go back into the field?

e. Who could buy this pesticide?

PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS

(DANGER)

Poisonous by swallowing or inhalation. Do not breathe spray mist. Do not get in eyes. Avoid contact with skin. Use only when wearing the following protective equipment and clothing. Wear tightly woven cotton overalls, waterproof hat, unlined neoprene gloves and boots. Wear safety goggles and/or face shield. Wear a mask or respirator jointly approved by the Mining Enforcement and Safety Administration and by the National Institute for Occupational Safety and Health. Before removing gloves, wash them with detergent and water. Always wash hands, face and arms with detergent and water before smoking, eating or drinking. For emergency assistance, call 000-000-0000.

TO PHYSICIAN: De Pesto is a reversible cholinesterase inhibitor. Do not use oximes such as 2-PAM. Give Atropine 2 mg. intravenously or subcutaneously. If in eye, instill one drop of Homatropine. Close supervision of the patient is indicated for at least 48 hours.

ENVIRONMENTAL HAZARDS

This pesticide is toxic to wildlife and fish. Use with care when applying in areas frequented by wildlife or adjacent to any body of water. Keep out of lakes, streams or ponds. Do not apply where runoff is likely to occur. Do not apply when weather conditions favor drift from target area. Do not contaminate water by cleaning of equipment or disposal of wastes.

PHYSICAL OR CHEMICAL HAZARDS

Flammable! Keep away from heat and open flame.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

RE-ENTRY STATEMENT (IF APPLICABLE)

Do not enter area within 5 days after application.

CATEGORY OF APPLICATOR (IF APPLICABLE)

STORAGE AND DISPOSAL

STORAGE—Do not contaminate water, food, or feed by storage or disposal. Open dumping is prohibited. DISPOSAL—Pesticide, spray mixture, or rinsate that cannot be used or chemically reprocessed should be disposed of in a landfill approved for pesticides or buried in a safe place away from water supplies. Containers should be triple rinsed and offered for recycling, reconditioning, or disposed in approved landfill or buried in a safe place.

Consult Federal, State or local Disposal authorities for approved alternate procedures.

RESTRICTED USE PESTICIDE

FOR RETAIL SALE TO AND APPLICATION ONLY BY
CERTIFIED APPLICATORS OR PERSONS UNDER THEIR
DIRECT SUPERVISION

DE PESTO

INSECTICIDE
EMULSIFIABLE CONCENTRATE

ACTIVE INGREDIENT:	pestoff—tri-salicylic acid	45.0%
INERT INGREDIENTS:		55.0%
TOTAL:		100.0%

THIS PRODUCT CONTAINS 4.0 LBS OF PESTOFF PER GALLON

KEEP OUT OF REACH OF CHILDREN

DANGER — POISON

STATEMENT OF PRACTICAL TREATMENT

IF SWALLOWED - Induce vomiting by giving a tablespoonful of salt in a glass of warm water. Repeat until vomitus is clear. Call a physician immediately.

IF INHALED - Remove to fresh air. Call a physician immediately.

IF IN EYES - Flush eyes with plenty of water for at least 15 minutes. Call a physician immediately.

IF ON SKIN - In case of contact, remove contaminated clothing and immediately wash skin with detergent and water.

SEE SIDE PANEL FOR ADDITIONAL
PRECAUTIONARY STATEMENTS

MFG BY A-Z CHEMICALS
TOWN, STATE

EPA EST. NO. 1367—STATE—1
EPA REGISTRATION NO. 1367-42

NET CONTENTS ONE GALLON

DIRECTIONS FOR USE CONTINUED

METHODS OF APPLICATION: The minimum gallonage requirement is 10 gallons of finished spray per acre with ground equipment, 2 gallons per acre with aircraft.

ALFALFA: Air and Ground Application—Alfalfa Weevil Larvae, Egyptian Alfalfa Weevil Larvae, Pea Aphid, and in New York state for Snout Beetle control. Apply the amount of De Pesto indicated in the chart, when feeding is noticed or when insects appear. Alfalfa Weevil Adult—Apply 1-2 pints per acre when insects appear. Lygus Bugs—Apply 2 pints per acre prior to bloom. Observe the indicated number of days after application before cutting or grazing. Do not apply more than once per season. Apply only to field planted to pure stands of Alfalfa.

Pints of De Pesto Per Acre	Do Not Cut or Graze Within
½	7 days
1	14 days
2	28 days

CORN, FIELD: Ground Application—Corn Rootworms—Use 1½ pints of De Pesto per 13,000 linear feet (1 acre with 40 inch spacing). Apply, at planting, as a 7 inch band over the row or inject on each side of the row by mixing with water or liquid fertilizers. When De Pesto is used with liquid fertilizers, mix in the following way making sure that the mixture is physically compatible. Premix 1 part of De Pesto with 2 parts of water. Add this premix to the tank of fertilizer along with rinsings from the premixing container. Maintain agitation in the tank after mixing and during application. Do not mix until ready to use.

SUGARCANE: Sugarcane Borer—Apply 1-1½ pints De Pesto per acre using ground or aerial equipment. Check sugarcane fields weekly, beginning in early June and continuing through August. Make first application only after visible joints form and 5% or more of the plants are infested with young larvae feeding in or under the leaf sheath and which have not bored into the stalks. Repeat whenever field checks indicate the infestation exceeds 5%. Do not apply within 17 days of harvest. Do not use in Hawaii.

ORANGES, LEMONS, GRAPEFRUIT, and TANGELOS in Arizona and California: Air and Ground application—Citrus thrips—Apply De Pesto at ½ to 1 lb. per acre. Use sufficient water to obtain thorough coverage (5 to 15 gals/acre by air). Use the higher rate on severe infestations of thrips. Apply in the early spring before bloom when the new growth is about 3 to 4 inches long. Make additional applications as needed until the new fruit is walnut size. Application at petal fall may be omitted to prevent fruit scarring. Applications during mid-summer to protect new growth on young trees are also recommended.

Do not apply within 1 day of harvest. Do not graze livestock in treated orchards for 10 days after treatment.

POTATO: Tuberworm, cabbage looper, aphids, and [illegible] east of the Mississippi River, leafhoppers and flea beetles. Apply De Pesto at indicated rates when field checks indicate the insect infestation is above 5%. Tuberworm, cabbage looper and aphids—apply ½ to 1 lb. per acre. Leafhopper and flea beetles—apply ½ lb per acre. Do not apply within 14 days of harvest.

LABELS AND LABELING
UNIT V

ANSWERS TO TEST

1. a. 6
   b. 7
   c. 8
   d. 2
   e. 1
   f. 4
   g. 3
   h. 5
   i. 9
2. b, c, d
3. a. 1
   b. 2
   c. 4
   d. 3
   e. 3
4. c. Environmental Protection Agency
5. a. Nomite
   b. metbutin
   c. Mow Chemical Company
   d. Methylethylbutyl phos
   e. Wettable powder
6. a. 2
   b. 3
   c. 1
7. a. 3
   b. 1
   c. 2

8. Discussion should include:
    a. Residue amounts are determined and safe tolerances are set
    b. Least number of days between last pesticide application and harvest or slaughter are determined to remain under tolerance
    c. Days to harvest or slaughter are listed on the label
    d. Harvest or slaughter should not be attempted before time period is over

9. a. Wait at least until the deposit has dried or the dust has settled before reentering the field, even with the least hazardous pesticides
    b. Follow safe reentry times on label
    c. Do not allow workers, children, or other persons to reenter the sprayed area until this time has passed
    d. Wear protective clothing and equipment as called for on the label if reentry must be made before time elapses

10. a. Hazard of poisoning
    b. Way pesticide is used
    c. Effects on the environment

11. b

12. a. pestoff
    b. 28 days
    c. 15 days--Do not apply within 14 days of harvest
    d. Monday
    e. Any certified pesticide applicator

PERSONAL SAFETY AND FIRST AID
UNIT VI

TERMINAL OBJECTIVE

After completion of this unit, the student should be able to distinguish between acute and chronic poisoning and between when to induce or not to induce vomiting. The student should be able to name the three families of pesticides and one example of each family and name ways pesticides enter the body. The student should be able to match signal words to categories of toxicity, match degrees of poisoning to the signs and symptoms of poisoning, match first aid kit items to their uses, and interpret labels correctly. The student should be able to name basic first aid rules and distinguish between safe and unsafe pesticide practices by surveying a farm. This knowledge will be evidenced by scoring one hundred percent on the unit test.

SPECIFIC OBJECTIVES

After completion of this unit, the student should be able to:

1. Match terms associated with personal safety and first aid to the correct definitions.
2. Distinguish between acute and chronic poisoning.
3. Discuss in a short paragraph the basis for signal words.
4. Match signal words to categories of toxicity.
5. Name the three most common families of pesticides and one example of each family.
6. Name the reasons for distinguishing between the families of pesticides.
7. Name three ways pesticides enter the body.
8. Name the most important routes of entry for pesticides.
9. Discuss in a short paragraph the purpose of the cholinesterase test.
10. Name the causes of most pesticide poisoning.
11. Match degrees of poisoning to the signs and symptoms of poisoning caused by nerve poisons.
12. Select from a list the signs and symptoms of fumigant poisoning.

13. Name the basic first aid rules for poison on skin, chemical burns, poison in the eye, and inhaled poison.

14. Select from a list the most important first aid measure in case of poisoning.

15. Distinguish between when to induce vomiting and when not to induce vomiting.

16. Discuss in a short paragraph the procedure for inducing vomiting.

17. Name the symptoms of shock.

18. Name the steps to follow in case of pesticide poisoning.

19. Name the local hospital or poison control center that serves your area and that can provide emergency treatment for pesticide poisoning.

20. Match first aid kit items to their uses.

21. Distinguish between safe and unsafe pesticide practices by surveying a farm.

22. Interpret pesticide labels as they relate to personal safety and first aid.

PERSONAL SAFETY AND FIRST AID
UNIT VI

SUGGESTED ACTIVITIES

I. Instructor:

   A. Provide student with objective sheet.

   B. Provide student with information and assignment sheets.

   C. Make transparencies.

   D. Collect chemical container labels for use in the classroom.

   E. Collect information related to pesticide poisoning and accidents.

   F. Discuss terminal and specific objectives.

   G. Discuss information and assignment sheets.

   (NOTE: If student does not have a farm to survey, assign him one.)

   H. Discuss safety information contained on labels.

   I. Have students assemble pesticide first aid kit.

   J. Give test.

II. Student:

   A. Read objective sheet.

   B. Study information sheet.

   C. Complete assignment sheets.

   (NOTE: If you do not live on a farm, check with one of your classmates or a farmer in your community.)

   D. Take test.

INSTRUCTIONAL MATERIALS

I. Objective sheet

II. Information sheet

III. Transparency masters

   A. TM 1--Signal Words

   B. TM 2--Ways Pesticides Enter Body

IV. Assignment sheets

   A. Assignment Sheet #1--Distinguish Between Safe and Unsafe Pesticide Practices

   B. Assignment Sheet #2--Describe Treatments for Poisonings

V. Test

VI. Answers to test

PERSONAL SAFETY AND FIRST AID
UNIT VI

INFORMATION SHEET

I. Terms and definitions

A. Antidote--Treatment given by a doctor to reduce the effects of pesticide poisoning

B. Absorb--To take a pesticide or other material into a plant, animal, or the soil

C. Acute poisoning--Poisoning which occurs after a single exposure to a pesticide

D. Chronic poisoning--Poisoning which occurs as a result of repeated exposures to pesticides over a period of time

E. Contact--To touch or be touched by

F. Dermal toxicity--How poisonous a pesticide is to man or animal when in contact with the skin

G. Dilute--To make a pesticide thinner or weaker by adding water, oil, or other material; to water down

H. First aid--First effort to help a victim while medical help is on the way

I. Inhalation--To take air into the lungs; to breath in

J. Inhalation toxicity--How poisonous a pesticide is to man or animal when breathed in through the lungs

K. LC_{50}--Concentration of a pesticide in the air which would kill half of the test animals exposed to it

(NOTE: The lower the LC number value, the more poisonous the pesticide. It is often used as the measure of acute inhalation toxicity.)

L. LD_{50}--Dose or amount of a pesticide which would kill half of a large number of test animals if eaten or absorbed through the skin

(NOTE: The lower the LD number value, the more poisonous the pesticide. LD number values are the commonly used measures of acute oral or acute dermal toxicity.)

M. Lethal--Deadly

N. Oral--Through the mouth

INFORMATION SHEET

O. Shock--Severe reaction of the human body to a serious injury; can result in death if not treated

P. Signs and symptoms--Warning that something is wrong

(NOTE: A sign is an outward signal of a disease or poisoning in a plant or animal, including humans. A symptom is a feeling of being sick.)

Q. Toxicity--How poisonous a pesticide is to a living organism

R. Vomitus--Matter which is vomited

II. Acute versus chronic poisoning

A. Acute--Poisoning which occurs after a single exposure to a pesticide

B. Chronic--Poisoning which occurs as a result of repeated exposures to pesticides over a period of time

(NOTE: Signs and symptoms of acute and chronic poisoning are the same.)

III. Basis for signal words (Transparency 1)

(NOTE: If any of these forms of toxicity is highly toxic, then the pesticide label must carry the signal word for highly toxic.)

A. Acute oral toxicity of the pesticide

B. Acute dermal toxicity of the pesticide

C. Acute inhalation toxicity of the pesticide

IV. Signal words and categories of toxicity

Categories	Signal Word Required on The Label	Categories of Acute Toxicity			Probable Oral Lethal Dose for 150 lb. man
		LD_{50}		LC_{50}	
		Oral mg/kg	Dermal	Inhalation mg/l	
I Highly Toxic	DANGER--skull and crossbones POISON	0-50	0-200	0-2,000	A few drops to a teaspoonful
II Moderately Toxic	WARNING	over 50 to 500	over 200 to 2,000	over 2,000 to 20,000	Over one teaspoonful to one ounce
III Slightly Toxic	CAUTION	over 500	over 2,000 to 20,000	---------------	Over one ounce to one pint or one pound
IV Relatively Nontoxic	NONE	over 5,000	over 20,000	---------------	Over one pint or one pound

INFORMATION SHEET

V. Families of pesticides

(NOTE: These are three common families of insecticides which act as nerve poisons. Common names are not capitalized; brand [trade] names are capitalized.)

A. Organophosphates or organophosphorous

1. parathion
2. TEPP
3. Phosdrin
4. phorate (Thimet)
5. demeton (Systox)
6. Di-Syston
7. Guthion
8. phosphamidon
9. Monitor
10. malathion

(NOTE: Many of the organophosphates are highly toxic orally, dermally, and through inhalation. Some are only slightly toxic.)

B. Carbamates

1. aldicarb (Temik)
2. carbofuran (Furadan)
3. carbaryl (Sevin)
4. formetanate hydrochloride (Carzol)
5. methomyl (Lannate)

(NOTE: Many carbamates are only moderately or slightly toxic. However, some are highly toxic orally, dermally, and through inhalation.)

C. Chlorinated hydrocarbons or organochlorines

(NOTE: DDT, aldrin, dieldrin, chlordane, and heptachlor belong to this family. However, they may not be registered or labeled for agricultural use in the future.)

1. endrin
2. lindane

INFORMATION SHEET

3. m[illegible]oxychlor

4. endosulfan (Thiodan)

5. dicosol (Kelthane)

   (NOTE: Most chlorinated hydrocarbons are considered hazardous because they persist in the environment. However, some are highly toxic dermally and orally.)

VI. Reasons for distinguishing between families of pesticides

- A. Pesticides within a family cause the same kinds of poisoning sickness
- B. Pesticides within a family are often similar in the hazards they cause
- C. First aid and antidote for poisoning are the same within a family

VII. Ways pesticides enter the body (Transparency 2)

- A. Oral
- B. Dermal
- C. Inhalation

VIII. Most important routes of entry for pesticides

- A. Applicator--Dermal and inhalation
- B. Small children--Oral and dermal

  (NOTE: You can be poisoned no matter which way the pesticide enters your body. It may enter and poison you through all three routes of entry at the same time.)

IX. Purpose of cholinesterase test

- A. Chemical cholinesterase is necessary for nervous system to function properly

  (NOTE: Without this chemical the person will die.)

- B. Carbamate and organophosphate pesticides attack cholinesterase in blood and make it useless
- C. Simple blood test determines cholinesterase level and degree of pesticide exposure

INFORMATION SHEET

X. Causes of most pesticide poisoning

  A. Careless practices

  B. Ignorance

  (NOTE: Learn safe procedures; it is for your own good.)

XI. Signs and symptoms of poisoning caused by nerve poisons

(NOTE: Some nerve poisons are organophosphates, carbamates, and chlorinated hydrocarbons.)

  A. Mild

    1. Fatigue
    2. Headache
    3. Dizziness
    4. Blurred vision
    5. Too much sweating and salivation
    6. Nausea and vomiting
    7. Stomach cramps and diarrhea

  B. Moderate

    1. Unable to walk
    2. Weakness
    3. Chest discomfort
    4. Muscle twitches
    5. Constriction of pupil of the eye
    6. Earlier symptoms become more severe

  C. Severe

    1. Unconsciousness
    2. Severe constriction of pupil of eye
    3. Muscle twitches

4. Secretion from mouth and nose
5. Breathing difficulty
6. Fever
7. Intense heat

(NOTE: Unfortunately, all signs and symptoms of pesticide poisoning are not the same. The sickness may be mild or severe, depending on the pesticide and the amount absorbed. However, the pattern of illness caused by one family of pesticides is always the same. On the other hand, having some of the signs and symptoms does not always mean you have been poisoned. Other kinds of sickness may cause similar signs and symptoms. Headache and a feeling of being unwell, for example, may signal the start of many kinds of illness. It is the pattern of symptoms that makes it possible to tell one kind of sickness from another.)

XII. Signs and symptoms of fumigant poisoning

A. Person appears drunk

B. Poor coordination

C. Slurring words

D. Confusion

E. Sleepiness

(CAUTION: Do not let yourself or anyone else get dangerously sick before calling your doctor or going to a hospital. It is better to be too cautious than too late. Take the container and the label of the pesticide to the doctor.)

XIII. Basic first aid rules

A. Poison on skin

1. Act quickly
2. Remove contaminated clothing and drench skin with water
3. Cleanse skin and hair thoroughly with detergent and water

   (NOTE: Detergents and commercial cleansers are better than soap.)

4. Dry victim and wrap in blanket

   (CAUTION: Do not allow pesticide to get on you while you are helping the victim.)

B. Chemical burn

1. Wash with large quantities of running water
2. Remove contaminated clothing
3. Cover burned area immediately with loose, clean, soft cloth

(NOTE: Do not apply ointments, greases, powders, or other drugs in first aid treatment of burns.)

C. Poison in eye

1. Wash eye quickly but gently
2. Hold eyelid open and wash with gentle stream of clean running water
3. Wash for 15 minutes or more

(CAUTION: Do not use chemicals or drugs in the wash water. They may increase the extent of the injury.)

D. Inhaled poison

(NOTE: If patient is in an enclosed area, do not enter without proper protective clothing and equipment. If proper clothing is not available, call for emergency equipment from your fire department.)

1. Carry victim to fresh air immediately
2. Get victim to a doctor
3. Open all doors and windows so no one else will be poisoned
4. Loosen tight clothing
5. Apply artificial respiration if breathing has stopped or is irregular
6. Keep victim as quiet as possible
7. Prevent chilling

(NOTE: An important step in good first aid is to call the doctor. It is the initial effort to help a victim while medical help is on the way that is important. Before going to call for emergency help if you are alone with the victim, make sure that the victim is breathing and that he/she is not further exposed. Always save the pesticide label for the doctor.)

XIV. Most important first aid measure--Remove or dilute the pesticide with water

INFORMATION SHEET

XV. When to induce or not to induce vomiting

A. Read the label for instructions

B. Never induce vomiting

1. If the victim is unconscious or is in convulsions

2. If the victim has swallowed a corrosive poison

(NOTE: A corrosive poison is a strong acid or alkali. A corrosive poison will burn the throat and mouth as severely coming up as it did going down. It may also get into the lungs and burn there also.)

3. If the victim has swallowed emulsifiable concentrate or oil solutions

(NOTE: Emulsifiable concentrates and oil solutions, like corrosive poisons, cause severe burns when vomited.)

C. Induce vomiting

1. If victim has swallowed a noncorrosive poison

2. If victim has swallowed a dilute form of petroleum product

XVI. Procedure for inducing vomiting

A. Position victim face down or kneeling forward

(CAUTION: Do not allow victim to lie on his back because the vomitus could enter the lungs and do additional damage.)

B. Give victim large amounts of milk or water

(NOTE: One to two cups should be given to a victim up to five years of age and up to a quart for victims five years of age and older.)

C. Put finger or the blunt end of a spoon at the back of victim's throat or have victim drink a glass of salted water

(CAUTION: Do not use anything which is sharp or pointed.)

D. Collect some of the vomitus for doctor if you do not know what the poison is

(NOTE: In any poisoning emergency, think first of water. Your first aim is to remove the pesticide no matter where it is. Then get the victim to a doctor fast.)

INFORMATION SHEET

XVII. Symptoms of shock

A. Skin pale, moist, cold, and clammy

B. Eyes vacant with dilated pupils

C. Breathing shallow and irregular

D. Pulse weak, rapid, and irregular

XVIII. Steps to follow in case of pesticide poisoning

A. Call doctor or take victim to the doctor or hospital

B. Check to see if patient is breathing

C. Locate pesticide label and have available for doctor

XIX. Poison control center or local hospital that serves your area and that can provide emergency treatment for pesticide poisoning

A. City ______________________ Address ____________

B. Telephone: Area Code __________ Number ____________________

(NOTE: Make sure your doctor has the number of the poison center.)

XX. Contents of first aid kit and their uses

A. Plastic bottle of detergent--Used to wash pesticides quickly off the skin

B. Plastic container of salt--Used to induce vomiting and to aid a person in shock

C. Plastic container of baking soda or bottle of milk of magnesia--When mixed with water will neutralize acidic chemicals that have been swallowed

D. Plastic bottle of lemon juice or vinegar--Used with water to neutralize basic or alkaline chemicals which have been swallowed

E. Bag of activated charcoal--When mixed with water and swallowed acts as an absorber of all pesticides

F. Shaped plastic airway--Used for mouth-to-mouth resuscitation

G. Plastic bottle of clean water--Used for diluting the salt, baking soda, lemon juice, or vinegar

H. Band-aids, bandages, and tape--Used for wrapping cuts and scrapes and for protecting burns

INFORMATION SHEET

I. Blanket--Used for covering a victim

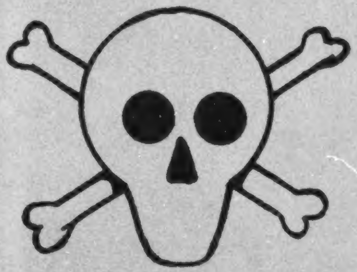
J. Dime--Used for emergency phone calls

K. Empty jar--Used as a drinking glass

TM 1

Signal Words

DANGER



POISON

Highly Toxic

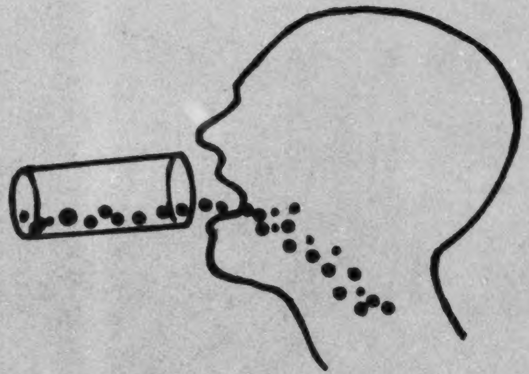
WARNING

Moderately Toxic

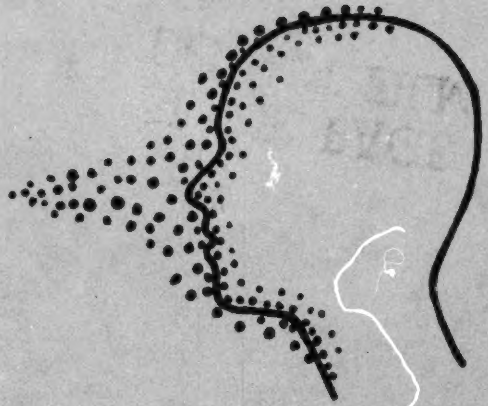
CAUTION

Slightly Toxic to
Relatively Nontoxic

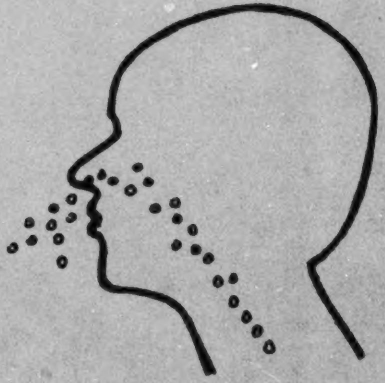
Ways Pesticides Enter Body



Oral



Dermal



Inhalation

PERSONAL SAFETY AND FIRST AID
UNIT VI

ASSIGNMENT SHEET #1–DISTINGUISH BETWEEN SAFE AND UNSAFE PESTICIDE PRACTICES

Everyone can improve his methods of handling pesticides. Each year many accidents occur because of improper and careless handling of pesticides. How do you stand? Are you following safe practices? Check yourself by answering the following questions as you are surveying a farm. Remember that one "NO" may be what gets you in trouble. When you have answered all the questions, return the assignment sheet to your instructor for evaluation.

STORE YOUR PESTICIDES SAFELY	Yes	No
Do you have a separate space to store pesticides?	☐	☐
Do you keep it locked and are the windows tight, barred, or boarded over?	☐	☐
Do you keep all your pesticides in this storage rather than in the garage, feed room, basement, porch, kitchen, or refrigerator?	☐	☐
Do you store herbicides separately from other pesticides?	☐	☐
Are there signs on your storage so firemen and others are warned?	☐	☐
Do you check periodically for leaking containers?	☐	☐
KEEP IN THE ORIGINAL CONTAINER SO THE LABEL IS THERE!		
Do you always keep pesticides in the original container instead of old "coke" bottles, milk cartons, or other food containers?	☐	☐
When people ask you for a little spray mix out of your tank do you refuse?	☐	☐
Do you always remember what is in an unlabeled container?	☐	☐
Do you always remember the safety precautions, antidotes, and directions for use, even though the container is not labeled?	☐	☐
Do you safely dispose of unlabeled pesticides, rather than take a chance with your memory?	☐	☐

USE THE RECOMMENDED CLOTHING AND PROTECTIVE EQUIPMENT

	Yes	No
Do you read the label to see what protective clothing you should wear?	☐	☐
Do you start each spraying day with clean spray clothing?	☐	☐
Do you check the signal words and precautions for use on the label to see what protective equipment is necessary?	☐	☐
Do you wear the protective equipment recommended on the label?	☐	☐
Do you clean and maintain your protective equipment regularly and often?	☐	☐
Do you throw away rubber gloves that have only tiny holes in them?	☐	☐

SPILLS AND SPLASHES OF CONCENTRATES CAN BE VERY HAZARDOUS!

	Yes	No
Do you know what to do if you should spill a pesticide on yourself while mixing?	☐	☐
Do you wear adequate footgear with your pant cuffs on the outside so pesticides won't run into your footgear?	☐	☐
Do you have sawdust, vermiculite, kitty litter, or some other absorbent on hand to soak up spills?	☐	☐
Do you always watch your sprayer tank when filling so it won't run over and spill on the ground?	☐	☐
Do you have a check valve or other device on your equipment to prevent back-siphoning into the water supply?	☐	☐
Is your application equipment well maintained so it doesn't leak and leave toxic puddles or piles of pesticide on the ground?	☐	☐
Do you avoid draining leftover spray mix on the ground?	☐	☐
Do you discard old high pressure hose instead of patching it and hoping no one will be nearby when it bursts?	☐	☐
Do you clean nozzles with a brush or by rinsing instead of blowing them out with your mouth?	☐	☐

POOR CONTAINER DISPOSAL MAY CAUSE BAD ACCIDENTS!

	Yes	No
Do you rinse each "empty" liquid container at least three times and dump the rinsings into the tank?	☐	☐
Do you keep your used containers in your storage area until disposed?	☐	☐
Do you collect every container for disposal before leaving a job instead of leaving them in the field or at your tank filling station?	☐	☐
Do you puncture, break, or crush nonburnable containers so they can't be reused?	☐	☐
Do you keep or return to the manufacturer 30 and 55 gallon pesticide drums, rather than giving them away for floats or trash barrels?	☐	☐

ATTRACTIVE NUISANCES CAN RESULT IN LAWSUITS!

	Yes	No
Do you keep your spray equipment where children cannot play on it?	☐	☐
Do you keep your spray equipment clean so that those touching it will not be contaminated?	☐	☐
Do you always release pressure on your equipment so spray guns won't be accidentally triggered?	☐	☐

CARE IN APPLICATION PREVENTS ACCIDENTS

	Yes	No
Do you check the wind direction and the area downwind before applying pesticides?	☐	☐
Do you consider substituting a safer chemical if you are spraying near a sensitive area?	☐	☐
Do you check for the possibility of showers and damaging runoff before applying pesticides?	☐	☐
Do you plan your pesticide application so it will have little or no effect on bees, birds, fish, or other wildlife?	☐	☐
Do you remove, turn over, or cover up pet dishes, sand boxes, and plastic pools before spraying private property?	☐	☐
Do you make sure that children and pets are out of the area and stay out until the spray dries?	☐	☐

PERSONAL SAFETY AND FIRST AID
UNIT VI

ASSIGNMENT SHEET #2--DESCRIBE TREATMENTS FOR POISONINGS

Listed below you will find several imaginary cases of poisoning. The purpose of this assignment is to determine if you have the ability and knowledge of describing the necessary treatment of each one. After completion of this assignment turn in to instructor for evaluation.

1. Your buddy has told you that he will be spraying in the southwest cotton fields all morning. When he doesn't appear for lunch you and a friend drive out and find him lying in the field. He is vomiting, is unable to walk, has pinpoint pupils, and his muscles are twitching.

   a. By what route of entry was your buddy poisoned?

   b. What would you do?

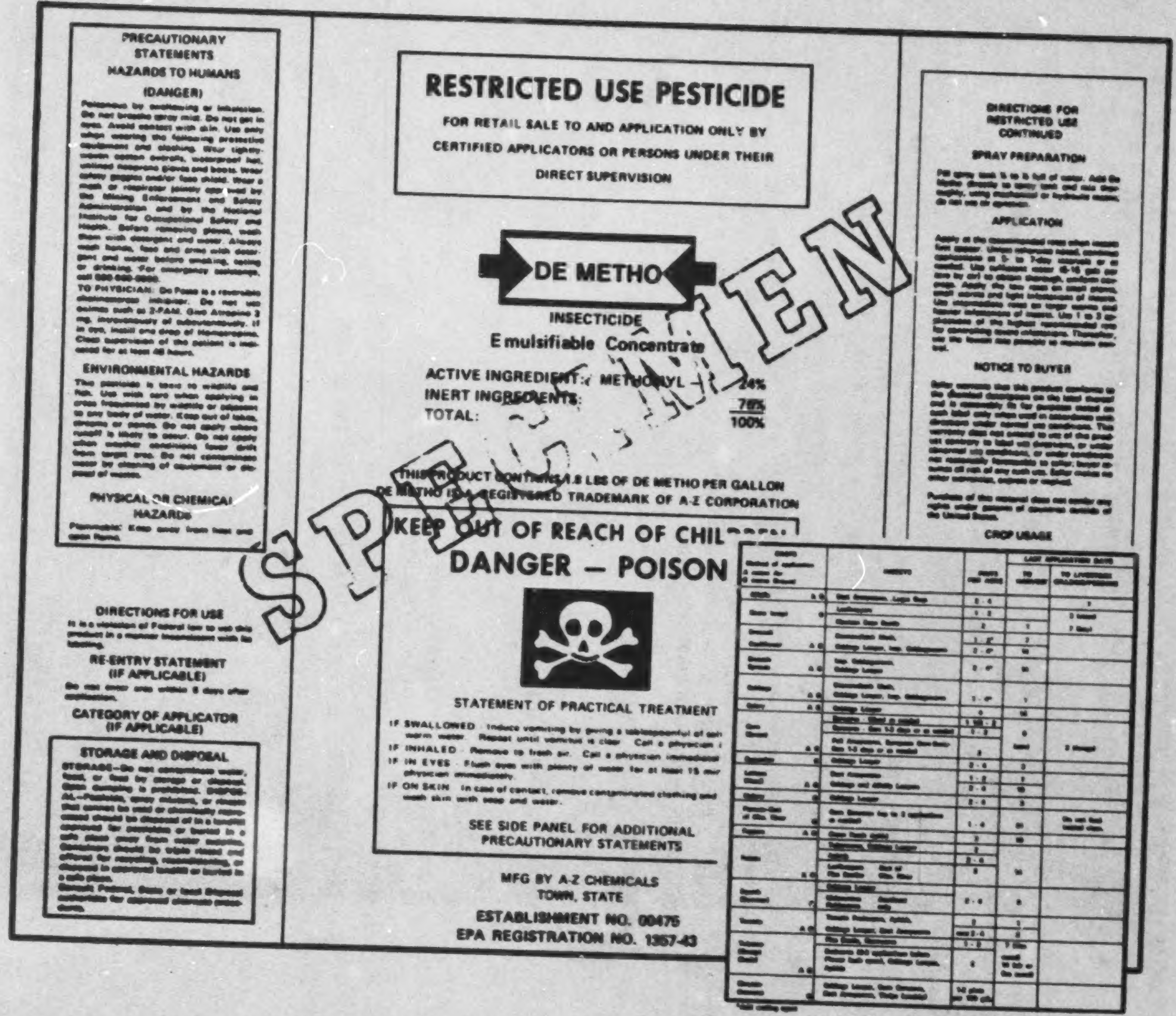
2. Your little brother is crying and screaming on the floor of the mixing area. You notice a bottle of De Metho next to him and see traces of it on his mouth and tongue. You are alone at the time.

   (NOTE: Use the De Metho label on the following page.)

   a. By which route of entry was your brother poisoned?

   b. What do you do?

ASSIGNMENT SHEET #2



PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS

(DANGER)

TO PHYSICIAN:

ENVIRONMENTAL HAZARDS

PHYSICAL OR CHEMICAL HAZARDS

DIRECTIONS FOR USE

RE-ENTRY STATEMENT (IF APPLICABLE)

CATEGORY OF APPLICATOR (IF APPLICABLE)

STORAGE AND DISPOSAL

RESTRICTED USE PESTICIDE

FOR RETAIL SALE TO AND APPLICATION ONLY BY CERTIFIED APPLICATORS OR PERSONS UNDER THEIR DIRECT SUPERVISION

DE METHO

INSECTICIDE

Emulsifiable Concentrate

ACTIVE INGREDIENT: METHOMYL	24%
INERT INGREDIENTS:	76%
TOTAL:	100%

THIS PRODUCT CONTAINS 1.8 LBS OF DE METHO PER GALLON

DE METHO IS A REGISTERED TRADEMARK OF A-Z CORPORATION

SPECIMEN

KEEP OUT OF REACH OF CHIL

DANGER — POISON

STATEMENT OF PRACTICAL TREATMENT

IF SWALLOWED - Induce vomiting by giving a tablespoonful of salt in warm water. Repeat until vomitus is clear. Call a physician i

IF INHALED - Remove to fresh air. Call a physician immediately.

IF IN EYES - Flush eyes with plenty of water for at least 15 min physician immediately.

IF ON SKIN - In case of contact, remove contaminated clothing and wash skin with soap and water.

SEE SIDE PANEL FOR ADDITIONAL PRECAUTIONARY STATEMENTS

MFG BY A-Z CHEMICALS
TOWN, STATE

ESTABLISHMENT NO. 00475
EPA REGISTRATION NO. 1357-43

DIRECTIONS FOR RESTRICTED USE CONTINUED

SPRAY PREPARATION

APPLICATION

NOTICE TO BUYER

CROP USAGE

3. Your buddy is treating a grain silo. You come by to check on him and he talks strangely and seems confused by your questions. He tells you that he wants to take a nap before finishing the job.

   a. What type of poisoning do you think he received?

   b. What do you do?

4. You have been spraying with phosphamidon and phorate for the past couple of weeks. Today, however, you were just working in a field which you recently sprayed. Now you have a headache and seem very dizzy. You are sweating, having severe stomach cramps, and beginning to vomit. You feel weak all over.

   a. What type of poisoning do you think you have?

   b. What should you do?

PERSONAL SAFETY AND FIRST AID
UNIT VI

ANSWERS TO ASSIGNMENT SHEET #2

1. a. Dermal and inhalation

   b. Get him and you out of the area fast. Send your friend to call a doctor and/or ambulance. Meanwhile, get your buddy to fresh air and take off his spray clothes and equipment. Wrap him in a blanket. If any chemical has soaked through to the skin, get him into a shower, pond, or other water source and wash the chemical off with detergent and water. Ask your friend to try to find the container and label of the pesticide being used. Keep him quiet until help arrives or wrap him in a blanket and take him and the pesticide label to the hospital.

2. a. Oral

   b. Get him and you out of the area fast. Take the container and label with you. The label says to induce vomiting by giving a teaspoon of salt in a glass of warm water. Keep giving your brother this until the vomitus is clear. Keep him on his knees leaning forward the whole time. Then get a large glass of cream or milk and try to get it down him. Call the doctor or ambulance. If any of the pesticide remains on his hands, mouth, clothing, or body, wash it off with detergent and water. Wrap him in a warm blanket and take him to the hospital or wait for the ambulance.

3. a. Acute fumigant

   b. Yell for help and have somebody nearby call the doctor. Put on an air supplied respirator before going in after him. Get you and your buddy to fresh air immediately. If you have oxygen available (air supplied respirator), give him some. Make sure he is breathing. Remove all of his clothing and if necessary wash him with detergent and water. Wrap him in a warm blanket. Have someone get the pesticide and label that he was using. Wait for ambulance or get victim and pesticide label to the hospital.

4. a. Chronic organophosphate

   b. Have someone drive you to the hospital or call an ambulance. Take along the labels which you have been using recently. Ask them to check your blood cholinesterase level.

PERSONAL SAFETY AND FIRST AID
UNIT VI

TEST

1. Match the terms on the right to the correct definitions on the left by placing the appropriate numbers in the blanks provided.

_____a. Treatment given by a doctor to reduce the effects of pesticide poisoning

_____b. Through the mouth

_____c. Matter which is vomited

_____d. To take a pesticide or other material into a plant, animal, or the soil

_____e. How poisonous a pesticide is to a living organism

_____f. Deadly

_____g. Severe reaction of the human body to a serious injury; can result in death if not treated

_____h. Poisoning which occurs after a single exposure to a pesticide

_____i. Dose or amount of a pesticide which would kill half of a large number of test animals if eaten or absorbed through the skin

_____j. Poisoning which occurs as a result of repeated exposures to pesticides over a period of time

_____k. Concentration of a pesticide in the air which would kill half of the test animals exposed to it

_____l. To touch or be touched by

_____m. How poisonous a pesticide is to man or animal when breathed in through the lungs

_____n. How poisonous a pesticide is to man or animal when in contact with the skin

1. Inhalation
2. Inhalation toxicity
3. LC_{50}
4. LD_{50}
5. Lethal
6. Oral
7. Vomitus
8. Shock
9. Signs and symptoms
10. Toxicity
11. Antidote
12. Dilute
13. Absorb
14. Dermal toxicity
15. Acute poisoning
16. Contact
17. Chronic poisoning
18. First aid

_____o. To take air into the lungs; to breathe in

_____p. To make a pesticide thinner or weaker by adding water, oil, or other material; to water down

_____q. First effort to help a victim while medical help is on the way

_____r. Warning that something is wrong

2. Distinguish between acute and chronic poisoning by placing an "X" in front of the statement representing chronic poisoning.

_____a. Poisoning which occurs after a single exposure to a pesticide

_____b. Poisoning which occurs as a result of repeated exposures to pesticides over a period of time

3. Discuss in a short paragraph the basis for signal words.

4. Match signal words on the right to the categories of toxicity on the left.

_____a. Moderately toxic

_____b. Slightly toxic to relatively nontoxic

_____c. Highly toxic

1. Danger, Skull and Crossbones, Poison
2. Warning
3. Caution

5. Name the three most common families of pesticides and one example of each family.

a.

b.

c.

6. Name the reasons for distinguishing between the families of pesticides.

a.

b.

c.

7. Name three ways pesticides enter the body.

a.

b.

c.

8. Name the most important routes of entry for pesticides.

a. Applicator--

b. Small children--

9. Discuss in a short paragraph the purpose of the cholinesterase test.

10. Name the causes of most pesticide poisoning.

a.

b.

11. Match the degrees of poisoning on the right to the signs and symptoms of poisoning on the left. Answers may be used more than once in a blank.

______a. Headache

______b. Muscle twitches

______c. Unable to walk

______d. Fever

______e. Blurred vision

______f. Constriction of pupil of the eye

______g. Chest discomfort

______h. Nausea and vomiting

______i. Intense heat

______j. Stomach cramps and diarrhea

______k. Secretion from mouth and nose

______l. Unconsciousness

1. Mild
2. Moderate
3. Severe

12. Select from the list below signs and symptoms of fumigant poisoning. Place an "X" in the appropriate blanks.

_____a. Confusion

_____b. Vomiting

_____c. Sweating

_____d. Poor coordination

_____e. Sleepiness

_____f. Slurring words

_____g. Wants to fight

_____h. Person appears drunk

13. Name the basic first aid rules for the following types of poisoning.

a. Poison on skin

b. Chemical burn

c. Poison in eye

d. Inhaled poison

14. Select from the list below the most important first aid measure in case of poisoning.

_____a. Antidote

_____b. Remove or dilute with water

_____c. Detergent

_____d. Commercial chemicals

15. Distinguish between when to induce vomiting and when not to induce vomiting by answering the following statements "Yes" or "No."

_____a. Victim swallowed an emulsifiable concentrate or oil solution

_____b. Victim swallowed a noncorrosive poison

_____c. Victim swallowed a corrosive poison

_____d. Victim swallowed a dilute form of petroleum product

16. Discuss in a short paragraph the procedure for inducing vomiting.

17. Name the symptoms of shock.

a.

b.

c.

d.

18. Name the steps to follow in case of pesticide poisoning.

a.

b.

c.

19. Name the local hospital or poison control center that serves your area and that can provide emergency treatment for pesticide poisoning.

20. Match the first aid kit items on the right to their uses on the left. Place the correct numbers in the blanks.

_____a. Used as a drinking glass

_____b. Used to wash pesticides quickly off the skin

_____c. Used for emergency phone calls

_____d. Used to induce vomiting and to aid a person in shock

_____e. Used for covering a victim

_____f. When mixed with water will neutralize acidic chemicals that have been swallowed

_____g. Used for wrapping cuts and scrapes and for protecting burns

_____h. Used with water to neutralize basic or alkaline chemicals which have been swallowed

_____i. Used for diluting the salt, baking soda, lemon juice, or vinegar

_____j. Used for mouth-to-mouth resuscitation

_____k. When mixed with water and swallowed acts as an absorber of all pesticides

1. Bag of activated charcoal
2. Plastic bottle of detergent
3. Empty jar
4. Shaped plastic airway
5. Plastic container of salt
6. Dime
7. Plastic container of baking soda or bottle of milk of magnesia
8. Plastic bottle of lemon juice or vinegar
9. Plastic bottle of clean water
10. Band-aids, bandages, and tape
11. Blanket

21. Distinguish between safe and unsafe pesticide practices by surveying a farm.

(NOTE: If the above activity has not been accomplished prior to the test, ask your instructor when it should be completed.)

22. Interpret the following De Pesto label correctly by answering the questions below using the label.

a. What would you do if a friend accidentally swallowed this pesticide?

b. By what routes of entry will this pesticide poison humans?

c. What is the antidote which a physician would use for this type of poisoning?

PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS

(DANGER)

Poisonous by swallowing or inhalation. Do not breathe spray mist. Do not get in eyes. Avoid contact with skin. Use only when wearing the following protective equipment and clothing. Wear tightly-woven cotton overalls, waterproof hat, unlined neoprene gloves and boots. Wear safety goggles and/or face shield. Wear a mask or respirator jointly approved by the Mining Enforcement and Safety Administration and by the National Institute for Occupational Safety and Health. Before removing gloves, wash them with detergent and water. Always wash hands, face and arms with detergent and water before smoking, eating or drinking. For emergency assistance, call 000-000-0000.

TO PHYSICIAN: De Pesto is a reversible cholinesterase inhibitor. Do not use oximes such as 2-PAM. Give Atropine 2 mg. intravenously or subcutaneously. If in eye, instill one drop of Homatropine. Close supervision of the patient is indicated for at least 48 hours.

ENVIRONMENTAL HAZARDS

This pesticide is toxic to wildlife and fish. Use with care when applying in areas frequented by wildlife or adjacent to any body of water. Keep out of lakes, streams or ponds. Do not apply where runoff is likely to occur. Do not apply when weather conditions favor drift from target area. Do not contaminate water by cleaning of equipment or disposal of wastes.

PHYSICAL OR CHEMICAL HAZARDS

Flammable! Keep away from heat and open flame.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

RE-ENTRY STATEMENT (IF APPLICABLE)

Do not enter area within 5 days after application.

CATEGORY OF APPLICATOR (IF APPLICABLE)

STORAGE AND DISPOSAL

STORAGE—Do not contaminate water, food, or feed by storage or disposal. Open dumping is prohibited. DISPOSAL—Pesticide, spray mixture, or rinsate that cannot be used or chemically reprocessed should be disposed of in a landfill approved for pesticides or buried in a safe place away from water supplies. Containers should be triple rinsed and offered for recycling, reconditioning, or disposal in approved landfill or buried in a safe place.

Consult Federal, State or local Disposal authorities for approved alternate procedures.

RESTRICTED USE PESTICIDE

FOR RETAIL SALE TO AND APPLICATION ONLY BY CERTIFIED APPLICATORS OR PERSONS UNDER THEIR DIRECT SUPERVISION

DE PESTO

INSECTICIDE
EMULSIFIABLE CONCENTRATE

ACTIVE INGREDIENT: pestoff—tri-salicylic acid	45.0%
INERT INGREDIENTS:	55.0%
TOTAL:	100.0%

THIS PRODUCT CONTAINS 4.0 LBS OF PESTOFF PER GALLON

KEEP OUT OF REACH OF CHILDREN

DANGER — POISON

STATEMENT OF PRACTICAL TREATMENT

IF SWALLOWED - Induce vomiting by giving a tablespoonful of salt in a glass of warm water. Repeat until vomitus is clear. Call a physician immediately.

IF INHALED - Remove to fresh air. Call a physician immediately.

IF IN EYES - Flush eyes with plenty of water for at least 15 minutes. Call a physician immediately.

IF ON SKIN - In case of contact, remove contaminated clothing and immediately wash skin with detergent and water.

SEE SIDE PANEL FOR ADDITIONAL PRECAUTIONARY STATEMENTS

MFG BY A-Z CHEMICALS
TOWN, STATE

EPA EST. NO. 1357—STATE—1
EPA REGISTRATION NO. 1357-42

NET CONTENTS ONE GALLON

DIRECTIONS FOR USE CONTINUED

METHODS OF APPLICATION: The minimum gallonage requirement is 10 gallons of finished spray per acre with ground equipment, 2 gallons per acre with aircraft.

ALFALFA: Air and Ground Application—Alfalfa Weevil Larvae, Egyptian Alfalfa Weevil Larvae, Pea Aphid, and in New York state for Snout Beetle control. Apply the amount of De Pesto indicated in the chart, when feeding is noticed or when insects appear. Alfalfa Weevil Adult—Apply 1-2 pints per acre when insects appear. Lygus Bugs—Apply 2 pints per acre prior to bloom. Observe the indicated number of days after application before cutting or grazing. Do not apply more than once per season. Apply only to field planted to pure stands of Alfalfa.

Pints of De Pesto Per Acre	Do Not Cut or Graze Within
½	7 days
1	14 days
2	28 days

CORN, FIELD: Ground Application—Corn Rootworms—Use 1½ pints of De Pesto per 13,000 linear feet (1 acre with 40 inch spacing). Apply, at planting, as a 7 inch band over the row or insert on each side of the row by mixing with water or liquid fertilizers. When De Pesto is used with liquid fertilizers, mix in the following way making sure that the mixture is physically compatible. Premix 1 part of De Pesto with 2 parts of water. Add this premix to the tank of fertilizer along with rinsings from the premixing container. Maintain agitation in the tank after mixing and during application. Do not mix until ready to use.

SUGARCANE: Sugarcane Borer—Apply [illegible] pints De Pesto per acre using ground or [illegible] equipment. Check sugarcane fields weekly, beginning in early June and continuing through August. Make first application only after visible joints form and 5% or more of the plants are infested with young larvae feeding in or under the leaf sheath and which have not bored into the stalks. Repeat whenever field checks indicate the infestation exceeds 5%. Do not apply within 17 days of harvest. Do not use in Hawaii.

ORANGES, LEMONS, GRAPEFRUIT, and TANGELOS in Arizona and California: Air and Ground application—Citrus thrips—Apply De Pesto at ½ to 1 lb. per acre. Use sufficient water to obtain thorough coverage (5 to 15 gals/acre by air). Use the higher rate on severe infestations of thrips. Apply in the early spring before bloom when the new growth is about 3 to 4 inches long. Make additional applications as needed until the new fruit is walnut size. Application at petal fall may be critical to prevent fruit scarring. Applications during mid-summer to protect new growth on young trees are also recommended.

Do not apply within 1 day of harvest. Do not graze livestock in treated orchards for 10 days after treatment.

POTATO: Tuberworm, cabbage looper, aphids, and in areas east of the Mississippi River, leafhoppers and flea beetles. Apply De Pesto at indicated rates when field checks indicate the insect infestation is above 5%. Tuberworm, cabbage looper and aphid—apply ½ to 1 lb. per acre. Leafhopper and flea beetles—apply ½ lb per acre. Do not apply within 14 days of harvest.

PERSONAL SAFETY AND FIRST AID
UNIT VI

ANSWERS TO TEST

1. a. 11
   b. 6
   c. 7
   d. 13
   e. 10
   f. 5
   g. 8
   h. 15
   i. 4
   j. 17
   k. 3
   l. 16
   m. 2
   n. 14
   o. 1
   p. 12
   q. 18
   r. 9

2. b

3. Discussion should include:

   a. Acute oral toxicity of pesticide

   b. Acute dermal toxicity of pesticide

   c. Acute inhalation toxicity of pesticide

4. a. 2
   b. 3
   c. 1

5. a. Organophosphates or organophosphorous--Example should be any one of the following:

   parathion, TEPP, Phosdrin, phorate (Thimet), demeton (Systox), Di-Syston, Guthion, phosphamidon, Monitor, malathion

   b. Carbamates--Example should be any one of the following:

   aldicarb (Temik), carbofuran (Furadan), carbaryl (Sevin), formetanate hydrochloride (Carzol), methomyl (Lannate)

   c. Chlorinated hydrocarbons or organochlorines--Example should be any one of the following:

   endrin, lindane, methoxychlor, endosulfan (Thiodan), dicosol (Kelthane)

6. a. Pesticides within a family cause the same kind of poisoning sickness

b. Pesticides within a family are often similar in the hazards they cause

c. First aid and antidote for poisoning are the same within a family

7. a. Oral

b. Dermal

c. Inhalation

8. a. Dermal and inhalation

b. Oral and dermal

9. Discussion should include:

a. Chemical cholinesterase is necessary for nervous system to function properly

b. Carbamate and organophosphate pesticides attack cholinesterase in blood and make it useless

c. Simple blood test determines cholinesterase level and degree of pesticide exposure

10. a. Careless practices

b. Ignorance

11. a. 1

b. 2, 3

c. 2

d. 3

e. 1

f. 2, 3

g. 2

h. 1

i. 3

j. 1

k. 3

l. 3

12. a, d, e, f, h

13. a. Poison on skin

1) Act quickly

2) Remove contaminated clothing and drench skin with water

3) Cleanse skin and hair thoroughly with detergent and water

4) Dry victim and wrap in blanket

b. Chemical burn

   1) Wash with large quantities of running water

   2) Remove contaminated clothing

   3) Cover burned area immediately with loose, clean, soft cloth

c. Poison in eye

   1) Wash eye quickly but gently

   2) Hold eyelid open and wash with gentle stream of clean running water

   3) Wash for 15 minutes or more

d. Inhaled poison

   1) Carry victim to fresh air immediately

   2) Get victim to a doctor

   3) Open all doors and windows so no one else will be poisoned

   4) Loosen tight clothing

   5) Apply artificial respiration if breathing has stopped or is irregular

   6) Keep victim as quiet as possible

   7) Prevent chilling

14. b

15. a. No

    b. Yes

    c. No

    d. Yes

16. Discussion should include:

    a. Position victim face down or kneeling forward

    b. Give victim large amounts of milk or water

    c. Put finger or the blunt end of a spoon at the back of victim's throat or have victim drink a glass of salted water

    d. Collect some of the vomitus for doctor if you do not know what the poison is

17. a. Skin pale, moist, cold, and clammy
    b. Eyes vacant with dilated pupils
    c. Breathing shallow and irregular
    d. Pulse weak, rapid, and irregular

18. a. Call doctor or take victim to the doctor or hospital
    b. Check to see if patient is breathing
    c. Locate pesticide label and have available for doctor

19. Evaluated to the satisfaction of the instructor

20. a. 3
    b. 2
    c. 6
    d. 5
    e. 11
    f. 7
    g. 10
    h. 8
    i. 9
    j. 4
    k. 1

21. Evaluated to the satisfaction of the instructor

22. a. Induce vomiting by giving a tablespoon of salt in a glass of warm water. Repeat until vomitus is clear. Call a physician immediately.
    b. Oral and inhalation, probably dermal also (avoid contact with skin)
    c. atropine

SAFETY BEFORE, DURING, AND FOLLOWING APPLICATION
UNIT VII

TERMINAL OBJECTIVE

After completion of this unit, the student should be able to discuss safety steps for transporting pesticides. The student should be able to name safety rules before, during, and following pesticide application. The student should be able to discuss the types of clothing and equipment needed for pesticide applications and be able to interpret pesticide labels. This knowledge will be evidenced through demonstration and by scoring one-hundred percent on the unit test.

SPECIFIC OBJECTIVES

After completion of this unit, the student should be able to:

1. Match terms associated with safety in pesticide application to the correct definitions.
2. Name factors to consider before applying pesticides.
3. Discuss in a short paragraph safety steps for transporting pesticides.
4. Name factors that determine types of protective clothing and protective equipment needed.
5. Name safety precautions used while mixing and handling concentrated pesticides.
6. Discuss in a short paragraph reasons for not applying pesticides on a windy day.
7. Name ways to prevent exposure during application.
8. Discuss in a short paragraph what is meant by sensitive areas.
9. Select from a list ways to avoid spills, drifts, and runoff.
10. Discuss in a short paragraph steps for equipment safety and maintenance.
11. Select from a list the ideal times of day to apply pesticides.
12. Name factors to consider following application.
13. Name safety rules to follow in cleaning up after application.
14. Discuss in short paragraphs the types of protective clothing and equipment needed for pesticide applications.
15. Match types of respirators to their uses.
16. Name safety rules for using the respirator correctly.
17. Interpret labels correctly by answering questions pertaining to safety.

SAFETY BEFORE, DURING, AND FOLLOWING APPLICATION
UNIT VII

SUGGESTED ACTIVITIES

I. Instructor:
   A. Provide student with objective sheet.
   B. Provide student with information and assignment sheets.
   C. Make transparencies.
   D. Discuss terminal and specific objectives.
   E. Discuss information and assignment sheets.
   F. Give test.

II. Student:
   A. Read objective sheet.
   B. Study information sheet.
   C. Complete assignment sheets.
   D. Take test.

INSTRUCTIONAL MATERIALS

I. Objective sheet

II. Information sheet

III. Transparency masters
   A. TM 1--Securing Containers
   B. TM 2--Proper Mixing
   C. TM 3--Proper Clothing For Mixing
   D. TM 4--Protective Clothing and Equipment
   E. TM 5--Types of Respirators

IV. Assignment sheets
   A. Assignment Sheet #1--Interpret De Metho Label
   B. Assignment Sheet #2--Interpret No-Disease Label
   C. Assignment Sheet #3--Interpret Anti-Weed Label

V. Answers to assignment sheets

VI. Test

VII. Answers to test

SAFETY BEFORE, DURING, AND FOLLOWING APPLICATION
UNIT VII

INFORMATION SHEET

I. Terms and definitions

- A. Application--Process of directing or placing pesticides on or in plants, animals, buildings, soil, air, water, or other site
- B. Cartridge--Cylinder-shaped part of the respirator which absorbs fumes and vapors from the air
- C. Canister--Metal or plastic container filled with absorbent materials to filter fumes and vapors from the air
- D. Dose, dosage--Portion or amount of pesticide mixture which is directed at the target
- E. Downwind--Direction toward which the prevailing wind is blowing
- F. Drift--Movement by wind and air currents of droplets or particles of a pesticide
- G. Environment--Surroundings, usually water, air, soil, plants, and animals
- H. Vaporize--To form a gas and disappear into the air
- I. Exposure--Not protected or shielded; contact with pesticides through mouth, lungs, or skin
- J. Face shield--Piece of protective equipment used by a pesticide applicator to protect face from exposure
- K. Fume--Unpleasant or irritating smoke, vapor, or gas
- L. Neoprene--Synthetic rubber
- M. Pollute--To make unclean or unsafe
- N. Reentry interval--Period of time between a pesticide application and when persons can safely go back into an area without wearing protective clothing and equipment
- O. Respirator--Face mask which filters out poisonous gases and particles

  (NOTE: A respirator is used to protect the nose, mouth, and lungs from pesticide injury.)
- P. Target--Pest to be treated with a pesticide

INFORMATION SHEET

II. Factors to consider before applying pesticides

  A. Transportation

  (CAUTION: Use safest way of getting the pesticide to the place of application.)

  B. Climatic conditions

  (NOTE: Check for possible wind or rain before applying.)

  C. Protective clothing and equipment

  (NOTE: Use what is needed for the job. Remember that safety comes first.)

  D. Mixing and filling

  (CAUTION: Protect yourself and the environment.)

  E. Reading label

  (NOTE: This is a must. Always read the label for correct dosages, hazards, precautions, and the types of protective clothing and equipment that will be needed for the job.)

  F. Equipment

  (NOTE: Ask yourself if you have the correct equipment for the job and if the equipment is in proper working condition.)

III. Safety steps for transporting pesticides (Transparency 1)

  A. Never carry pesticides inside car or truck cab

  B. Secure containers to keep from shifting, rolling, or bouncing

  C. Never transport livestock feed, seeds, or groceries in the same load with pesticides

  D. Never allow children to ride on or near pesticides

  (CAUTION: Carelessness in moving pesticide poisons can result in broken containers, spills, contamination, and injury to people and animals.)

INFORMATION SHEET

IV. Factors that determine types of protective clothing and protective equipment needed

(NOTE: When concentrated pesticides are handled you must use neoprene or natural rubber gloves, a respirator, and any other protective gear specified. Most applicators who apply pesticides regularly wear either cotton coveralls or some other type of protective clothing. Remember that the label will state the precautions necessary for the pesticide being used. READ THE LABEL!)

A. Label

B. Toxicity of pesticide

(NOTE: Check the signal words on the label.)

C. Formulation

(NOTE: Some formulations are more hazardous to the applicator than others.)

D. Application equipment

(NOTE: If you will be drenched with spray or inhaling dust, spray or fumes take more precautions.)

E. Degree of exposure

(NOTE: Take more precautions if you will be working with pesticides for a long period of time.)

V. Safety precautions used while mixing and handling concentrated pesticides (Transparencies 2 and 3)

A. Use neoprene or natural rubber gloves, rubber apron, goggles, and a respirator if needed

(NOTE: When mixing concentrated and highly toxic pesticides all protective clothing and equipment must be worn, including a respirator.)

B. Mix only what will be used

C. Mix according to the label

D. Do not combine pesticides

(NOTE: Combining pesticides is sometimes approved. However, the label or a local expert must verify this.)

E. Avoid splashes, spills, and drift when opening containers

INFORMATION SHEET

F. Change clothes immediately in case of a splash or spill

G. Stand with head above fill hole of spray tank

(NOTE: Splashing pesticides in your face and eyes can be extremely dangerous. You must keep your head and face well above the fill hole. Do not stand downwind when pouring or mixing.)

VI. Reasons for not applying pesticides on a windy day

A. Injury to wildlife, plants, pollinators, and domestic animals

B. Contamination of surface water, such as ponds, streams, rivers, and lakes

C. Increase in inhalation and contact hazard to the applicator

(NOTE: The applicator is legally responsible for any injury or money loss on crops due to pesticide drift onto nontarget areas. Don't take a chance by spraying when it is windy.)

VII. Ways to prevent exposure during application

A. Wear protective clothing and equipment

B. Do not wipe hands on clothing

(NOTE: Carry a special towel for wiping hands.)

(CAUTION: Do not wipe gloves on your clothing, especially if chemicals are on the gloves. Your clothing can become contaminated and the chemicals may soak through to your skin.)

C. Never blow out clogged hoses, nozzles, or lines with your mouth

D. Never eat, drink, or smoke when handling pesticides

E. Work in pairs when handling hazardous pesticides or at least let someone know where you will be working

F. Keep persons, livestock, and pets out of spray area

(NOTE: When working with pesticides day after day, even moderately toxic chemicals can poison you. Wear protective equipment, especially a respirator.)

(CAUTION: Do not let children or pets play around sprayers, dusters, filler tanks, storage areas, or old pesticide containers. Use the proper rates. Overdose won't kill pests twice but may injure humans, crops, or wildlife.)

INFORMATION SHEET

VIII. Sensitive areas--Areas or locations of parks, playgrounds, bird and wildlife sanctuaries, ponds, streams, water supplies, barnyards, feedlots, pastures, bee yards, schools, homes, hospitals, and any other areas where out-of-place pesticides might cause harm

IX. Ways to avoid spills, drift, and runoff

A. Do not apply during high winds

B. Check equipment for leaks and proper delivery rate

C. Use proper formulation for the job

D. Do not apply if rain is approaching unless the pesticide calls for it, like some protectant fungicides and some herbicides

X. Steps for equipment maintenance and safety

A. Check for leaks in pump and tank

B. Check for leaky hose connections and carefully dispose of worn or cracked hoses

C. Keep spray tank lid tight

D. Stay with tank during filling

E. Shut down machinery while making repairs or adjustments

F. Do not blow out clogged lines with your mouth

(NOTE: Your application equipment can help you use pesticides safely. However, poor maintenance and careless use can add to the hazard.)

XI. Times of day to apply pesticides

A. Early morning

B. Evening

(NOTE: Wind speed is usually lowest at these times of day, and drift hazard is greatly reduced. Avoiding full daylight hours may lower the contact danger to birds, mammals, and pollinators.)

C. Anytime on a day which is calm or still and when crops or weeds are not in full bloom

INFORMATION SHEET

XII. What to do following application

A. Dispose of empty containers

B. Store leftover pesticides

C. Clean up equipment

D. Determine reentry interval

(NOTE: Reentry time on the label must be checked and reentry signs must be posted.)

XIII. Cleaning up after application

A. Always take a shower when you finish using pesticides

B. Change spray clothing daily and separate spray clothing from family laundry

C. Launder the spray clothing separately from all other clothing

D. Do not wash clothing in streams or ponds

(NOTE: The pesticides on your spray clothes could harm other people who touch them. Warn the person who will be washing your spray clothes of possible danger.)

XIV. Protective clothing and equipment needed for pesticide applications (Transparency 4)

(NOTE: Use protective clothing and equipment called for on the label.)

A. Gloves

1. Obtain unlined, elbow length neoprene or natural rubber gloves

(NOTE: Some chemicals will dissolve rubber or make it sticky.)

2. Make sure sleeves are outside your gloves

(NOTE: This should be done unless spraying overhead.)

3. Discard the gloves if any holes appear

4. Wash gloves with detergent and water before removing

(CAUTION: Never use cotton or leather gloves unless specified on the label. These can be more hazardous than no protection at all because they hold the pesticide close to your skin.)

INFORMATION SHEET

B. Coveralls

  1. Wear clean dry cotton coveralls that cover entire body

  2. Wear waterproof suit or apron when mixing highly toxic pesticides

  3. Wear waterproof suit when you may be drenched during application

  4. Wash clothes with detergent and water

C. Boots

  1. Wear lightweight, unlined neoprene or natural rubber boots

     (NOTE: Boots should cover your ankles.)

  2. Put pant legs outside of boots

     (NOTE: This will keep pesticide from draining into the boot.)

  3. Wash and dry boots inside and out after each use

D. Goggles and face shield

  1. Wear tight-fitting goggles or face shield

  2. Wear goggles or face shield when pouring and mixing

  3. Wash goggles or face shield after each use

  4. Wear plastic, rubber, or neoprene headband if possible

E. Head and neck covering

  1. Protect hair and skin on neck

  2. Wear waterproof wide-brimmed hats or hard hats

     (NOTE: In cool weather a hooded waterproof parka and a bill cap are also good.)

XV. Types of respirators and their uses (Transparency 5)

  A. Cartridge respirator

     (NOTE: This is a half-face mask which covers the nose and mouth only.)

1. Use when exposed to concentrated chemicals for short periods

2. Use when exposed to low concentration of toxic chemicals for long periods of time

(NOTE: The main limitation of this type of respirator is the short life of the absorbing material in the cartridge.)

B. Gas mask or cannister respirator--Use when exposed to toxic fumes in heavy concentrations for long periods of time

(NOTE: This is a respirator which covers the entire face and protects your eyes as well as your nose and mouth. It has more absorbent material than cartridge respirators.)

C. Air-supplied respirators and self-contained air-supplied respirators

(NOTE: These are respirators which cover the entire face. A separate air supply is used, not the air with pesticide vapors in it.)

1. Use when oxygen supply in air is low

2. Use when exposed to high concentrations of highly toxic pesticides in enclosed areas, such as fumigation

XVI. Safety rules for using respirator correctly

A. Make sure it fits properly on your face

(NOTE: It should be worn tightly enough to form a seal all around your face. Full beards often do not allow a seal to form properly and, therefore, are dangerous on pesticide applicators.)

B. Check filter often

(NOTE: Cartridges and cannisters should be changed at least after every eight hours of use. If you notice a pesticide odor, first check to be sure the respirator is fitted properly on your face. If the odor remains, change the cartridge or cannister immediately.)

C. Wash face piece with detergent and warm water

D. Rinse thoroughly and dry

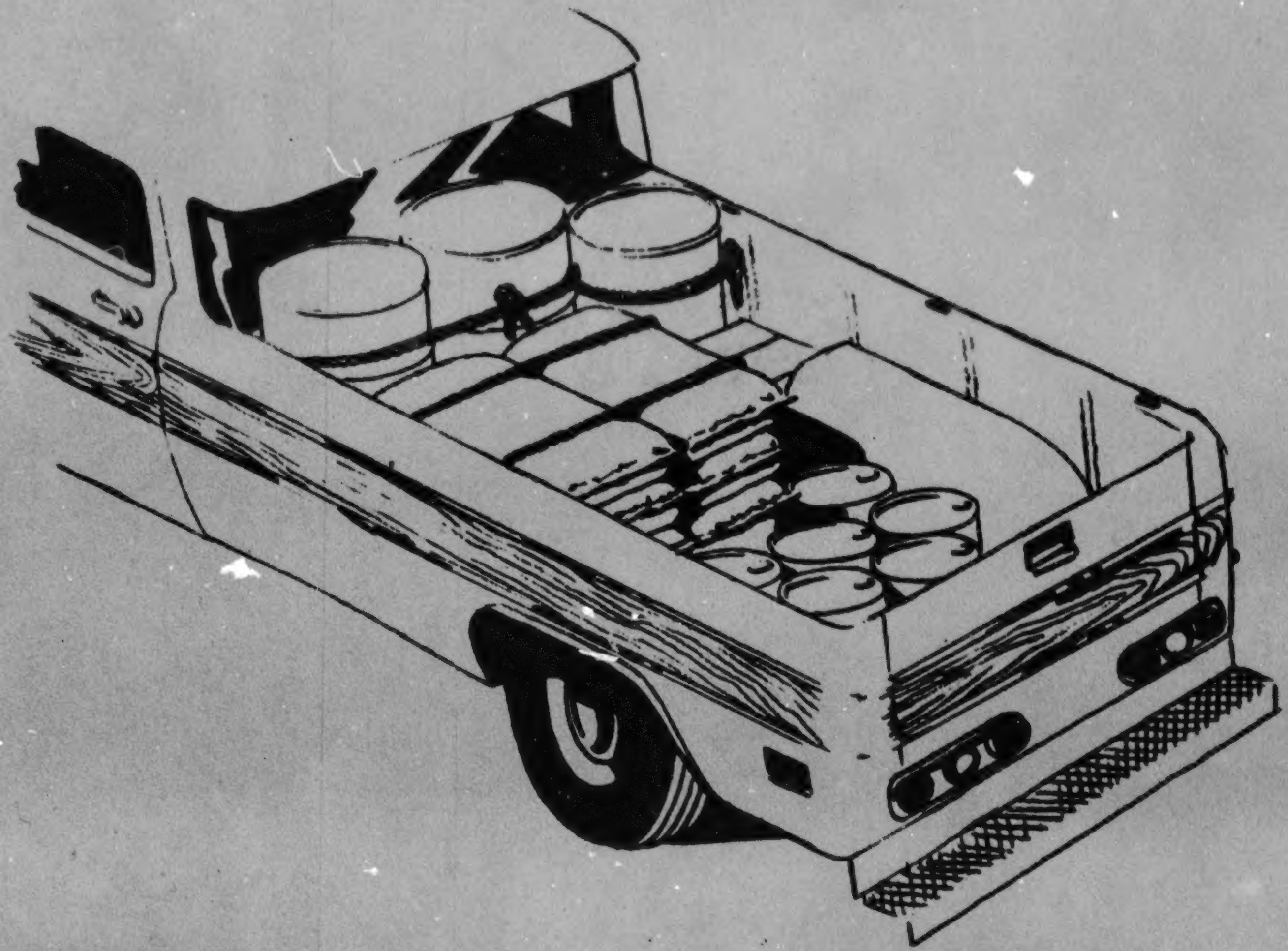
(NOTE: Store the respirator, filters, cannisters, and cartridges in a clean, dry place away from pesticides. A tightly closed plastic bag works well for storage.)

INFORMATION SHEET

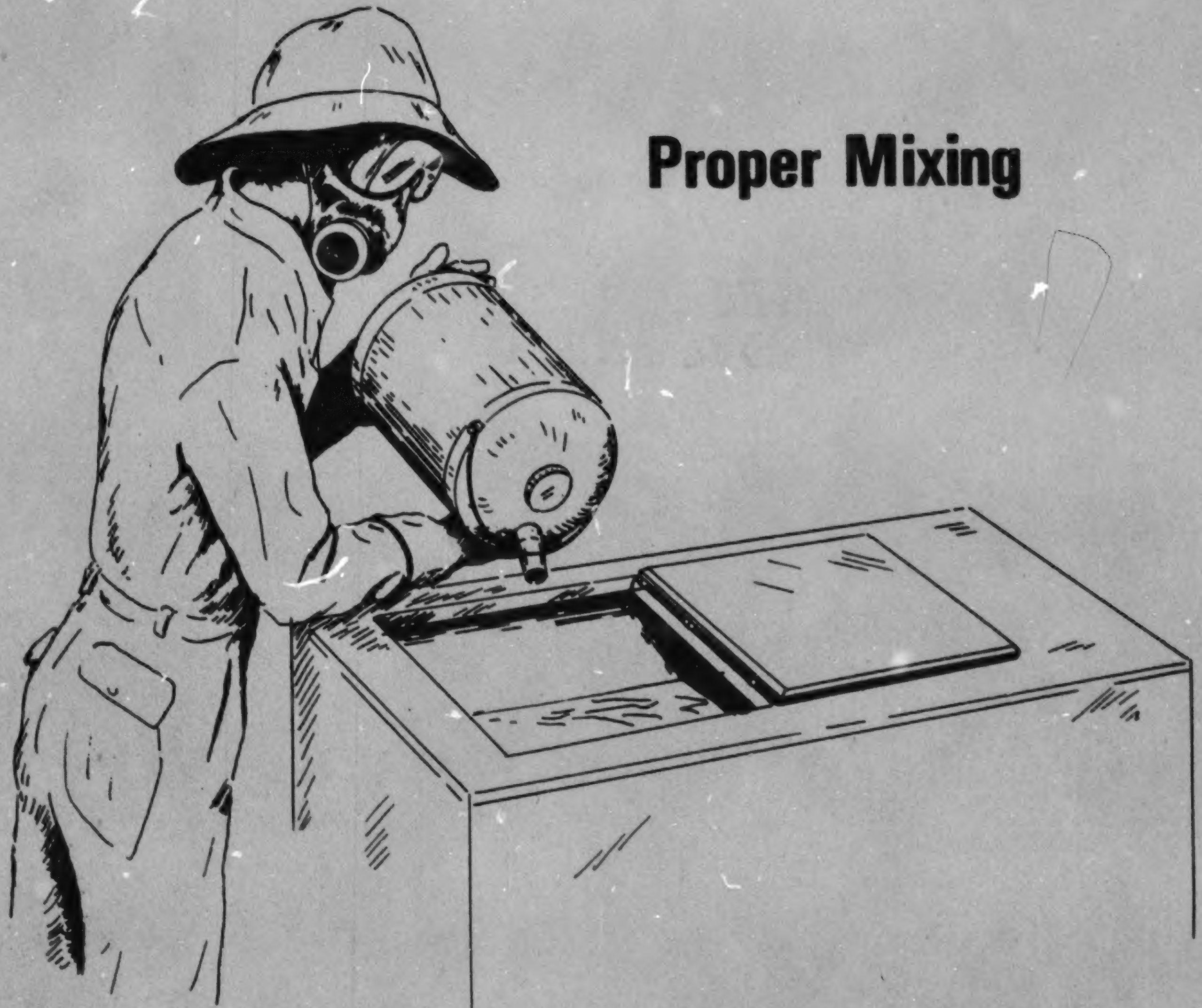
E. Use only those respirators approved by the National Institute for Occupational Safety and Health (NIOSH) or the Mining Enforcement and Safety Administration (MESA), both formerly U.S. Bureau of Mines

(NOTE: The approved respirators will bear a stamp with either NIOSH or MESA imprinted on them.)

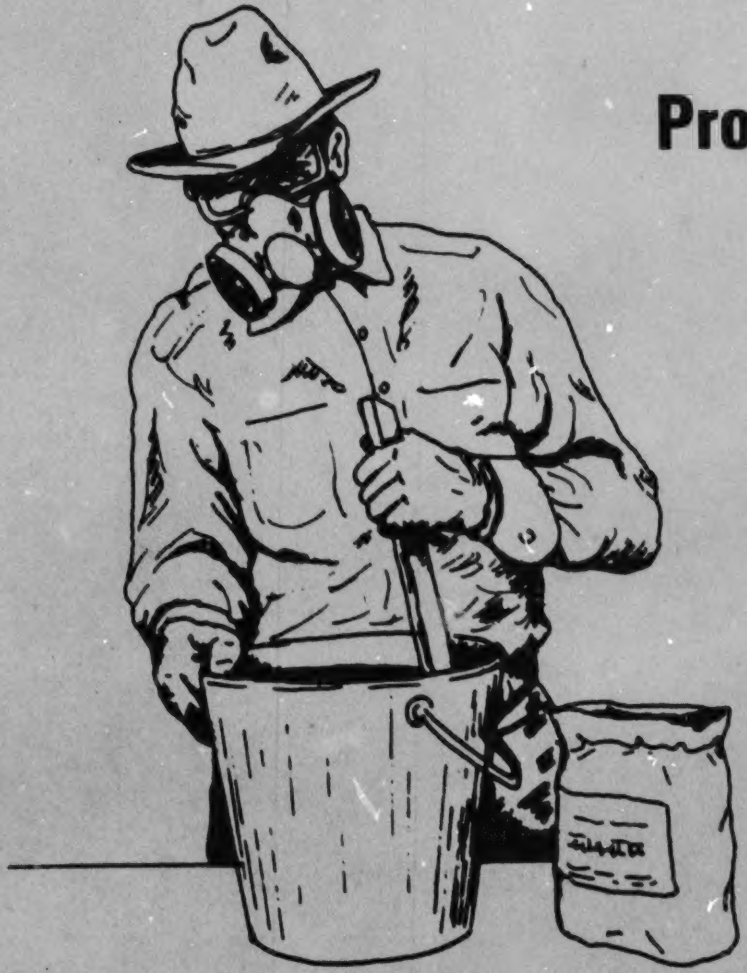
Securing Containers



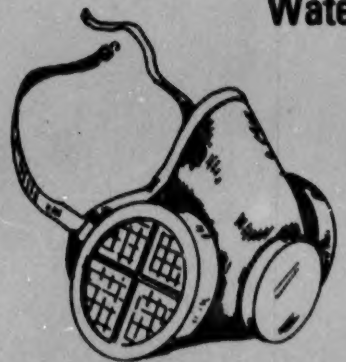
Proper Mixing



Proper Clothing for Mixing

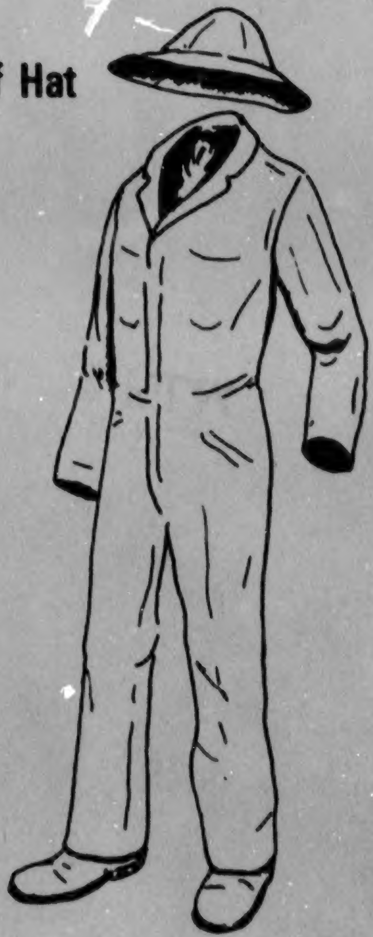


Protective Clothing and Equipment



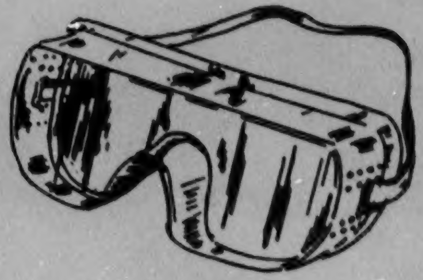
Respirator

Waterproof Hat

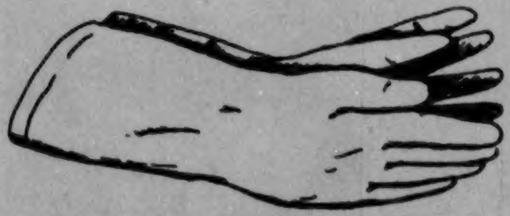


Long Pants Over Boots

Rubber Boots

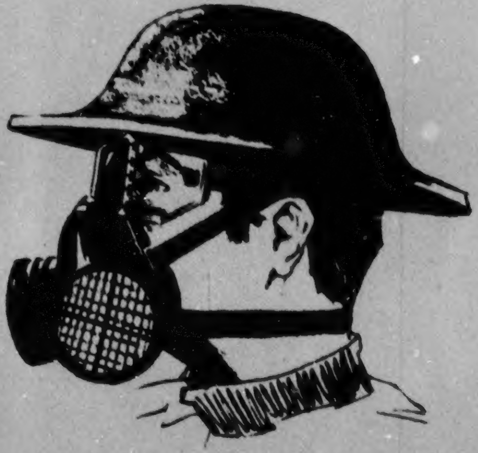


Goggles

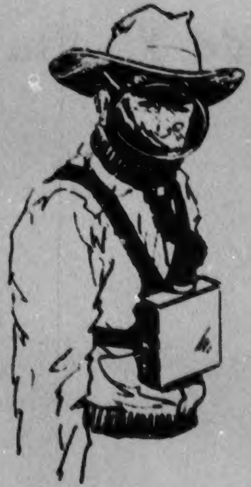


Long Rubber Gloves

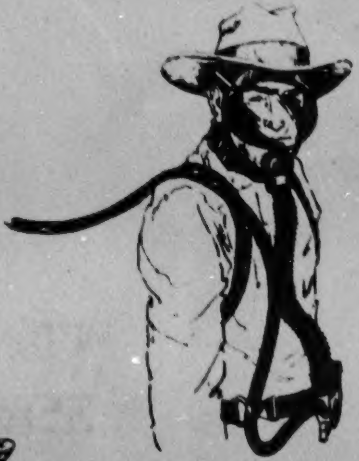
Types of Respirators



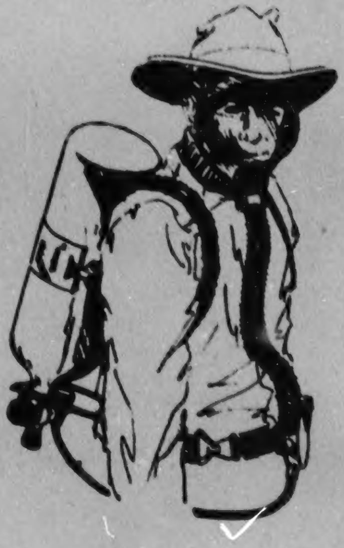
Cartridge



Cannister



Supplied Air



Self-contained

SAFETY BEFORE, DURING, AND FOLLOWING APPLICATION
UNIT VII

ASSIGNMENT SHEET #1--INTERPRET DE METHO LABEL

The purpose of this assignment is to allow you to locate important information that must be contained on all pesticide labels. Read the label on the following page and answer the questions below. When completed, return assignment sheet to instructor for evaluation.

1. What signal words are on the label?

2. What toxicity category do they represent?

3. What protective clothing would you wear?

4. What protective equipment would you use?

5. Who approved respirators for use with De Metho?

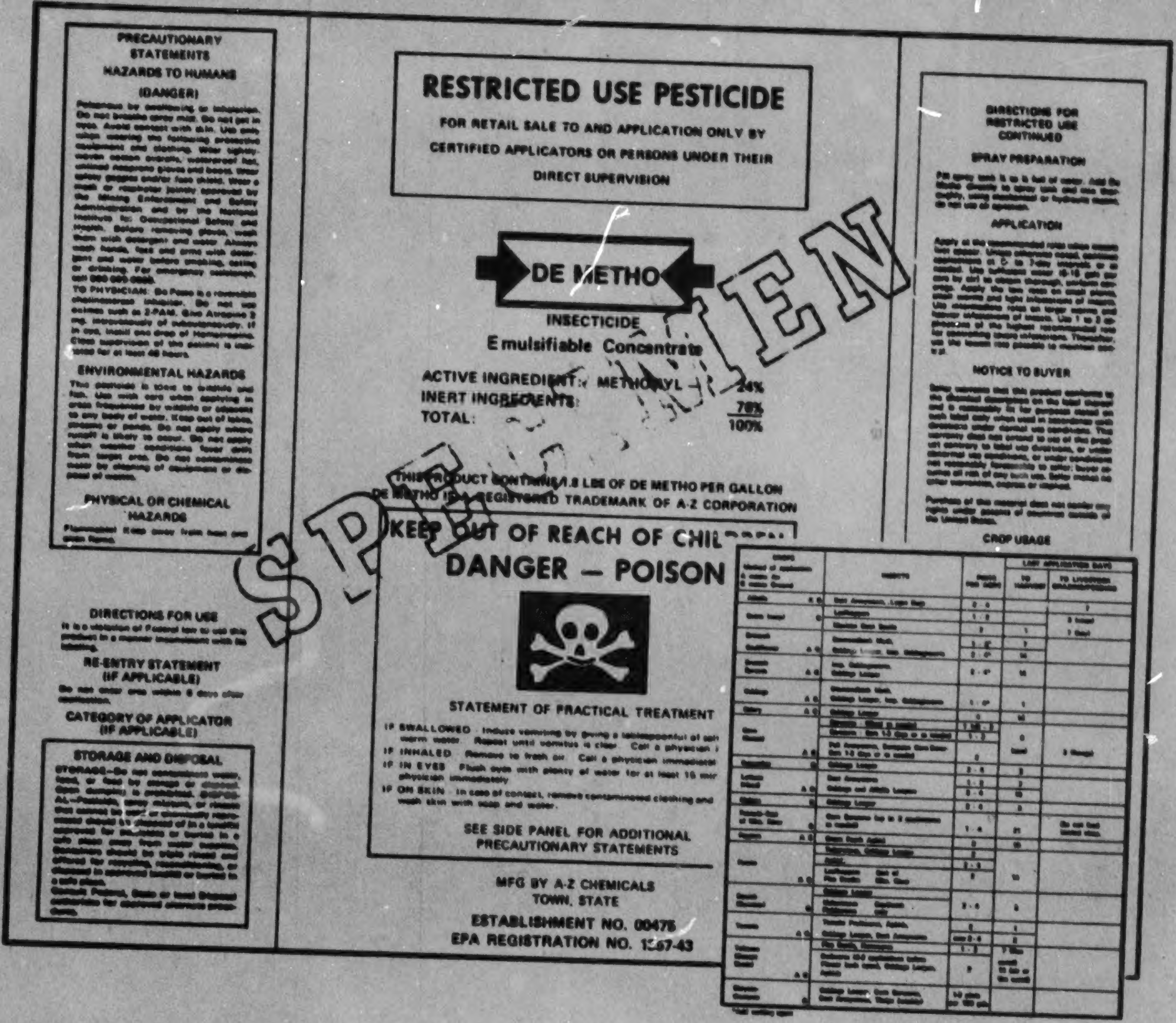
6. Should you tuck the trousers into the boots?

7. Should you tuck the sleeves into the gloves?

8. Is drift a problem with this pesticide?

9. What would you wear while mixing De Metho?

ASSIGNMENT SHEET #1



PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS

(DANGER)

TO PHYSICIAN:

ENVIRONMENTAL HAZARDS

PHYSICAL OR CHEMICAL HAZARDS

DIRECTIONS FOR USE

RE-ENTRY STATEMENT (IF APPLICABLE)

CATEGORY OF APPLICATOR (IF APPLICABLE)

STORAGE AND DISPOSAL

RESTRICTED USE PESTICIDE

FOR RETAIL SALE TO AND APPLICATION ONLY BY CERTIFIED APPLICATORS OR PERSONS UNDER THEIR DIRECT SUPERVISION

DE METHO

INSECTICIDE

Emulsifiable Concentrate

ACTIVE INGREDIENT: METHOMYL	24%
INERT INGREDIENTS:	76%
TOTAL:	100%

THIS PRODUCT CONTAINS 1.8 LBS OF DE METHO PER GALLON

DE METHO IS A REGISTERED TRADEMARK OF A-Z CORPORATION

KEEP OUT OF REACH OF CHILDREN

DANGER — POISON

STATEMENT OF PRACTICAL TREATMENT

IF SWALLOWED - Induce vomiting by giving a tablespoonful of salt [illegible] warm water. Repeat until vomitus is clear. Call a physician [illegible]

IF INHALED - Remove to fresh air. Call a physician immediately

IF IN EYES - Flush eyes with plenty of water for at least 15 min[illegible] physician immediately.

IF ON SKIN - In case of contact, remove contaminated clothing and wash skin with soap and water.

SEE SIDE PANEL FOR ADDITIONAL PRECAUTIONARY STATEMENTS

MFG BY A-Z CHEMICALS
TOWN, STATE

ESTABLISHMENT NO. 00475
EPA REGISTRATION NO. 1[illegible]67-43

DIRECTIONS FOR RESTRICTED USE CONTINUED

SPRAY PREPARATION

APPLICATION

NOTICE TO BUYER

CROP USAGE

SPECIMEN

SAFETY BEFORE, DURING, AND FOLLOWING APPLICATION
UNIT VII

ASSIGNMENT SHEET #2--INTERPRET NO-DISEASE LABEL

The purpose of this assignment is to allow you to locate important information that must be contained on all pesticide labels. Read the label on the following page and answer the questions below. When completed, return assignment sheet to instructor for evaluation.

1. What signal word appears on the label?

2. What toxicity category does the signal word represent?

3. What protective clothing would you wear?

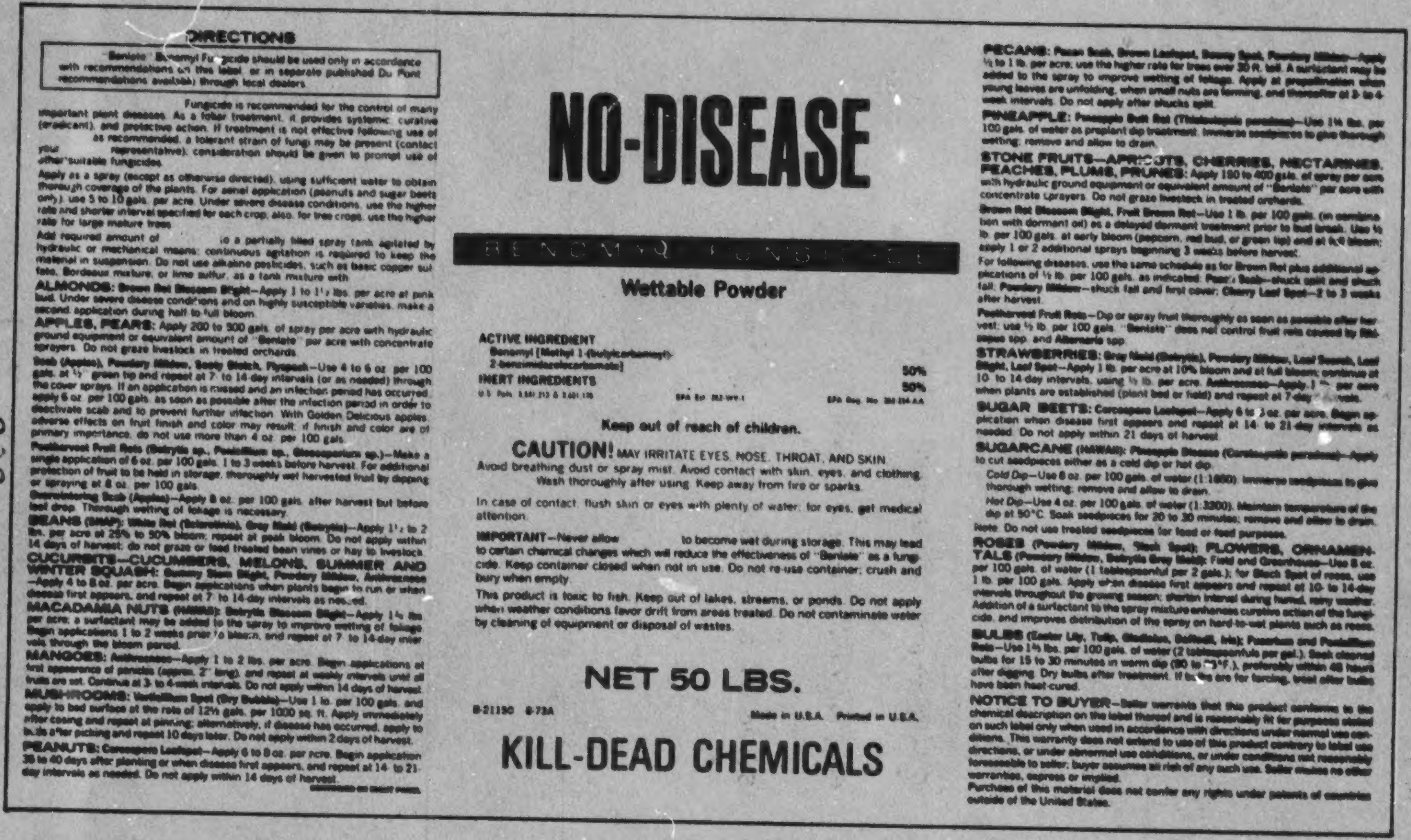
4. What protective equipment would you wear?

5. Would you need to take a shower after you finish the job?

6. Since this has a caution label, would it be okay to smoke or eat a candy bar during application?

7. What would you wear while mixing the No-Disease?

ASSIGNMENT SHEET #2



DIRECTIONS

"Benlate" Benomyl Fungicide should be used only in accordance with recommendations on this label, or in separate published Du Pont recommendations available through local dealers.

Fungicide is recommended for the control of many important plant diseases. As a foliar treatment, it provides systemic, curative (eradicant), and protective action. If treatment is not effective following use of as recommended, a tolerant strain of fungi may be present (contact your representative); consideration should be given to prompt use of other suitable fungicides.

Apply as a spray (except as otherwise directed), using sufficient water to obtain thorough coverage of the plants. For aerial application (peanuts and sugar beets only), use 5 to 10 gals. per acre. Under severe disease conditions, use the higher rate and shorter interval specified for each crop; also, for tree crops, use the higher rate for large mature trees.

Add required amount of to a partially filled spray tank agitated by hydraulic or mechanical means; continuous agitation is required to keep the material in suspension. Do not use alkaline pesticides, such as basic copper sulfate, Bordeaux mixture, or lime sulfur, as a tank mixture with

ALMONDS: Brown Rot Blossom Blight—Apply 1 to 1½ lbs. per acre at pink bud. Under severe disease conditions and on highly susceptible varieties, make a second application during half to full bloom.

APPLES, PEARS: Apply 200 to 300 gals. of spray per acre with hydraulic ground equipment or equivalent amount of "Benlate" per acre with concentrate sprayers. Do not graze livestock in treated orchards.

Scab (Apples), Powdery Mildew, Sooty Blotch, Flyspeck—Use 4 to 6 oz. per 100 gals. at ½" green tip and repeat at 7- to 14-day intervals (or as needed) through the cover sprays. If an application is missed and an infection period has occurred, apply 6 oz. per 100 gals. as soon as possible after the infection period in order to deactivate scab and to prevent further infection. With Golden Delicious apples, adverse effects on fruit finish and color may result; if finish and color are of primary importance, do not use more than 4 oz. per 100 gals.

Postharvest Fruit Rots (Botrytis sp., Penicillium sp., Gloeosporium sp.)—Make a single application of 6 oz. per 100 gals. 1 to 3 weeks before harvest. For additional protection of fruit to be held in storage, thoroughly wet harvested fruit by dipping or spraying at 8 oz. per 100 gals.

Overwintering Scab (Apples)—Apply 8 oz. per 100 gals. after harvest but before leaf drop. Thorough wetting of foliage is necessary.

BEANS (SNAP): White Rot (Sclerotinia), Gray Mold (Botrytis)—Apply 1½ to 2 lbs. per acre at 25% to 50% bloom; repeat at peak bloom. Do not apply within 14 days of harvest; do not graze or feed treated bean vines or hay to livestock.

CUCURBITS—CUCUMBERS, MELONS, SUMMER AND WINTER SQUASH: Gummy Stem Blight, Powdery Mildew, Anthracnose—Apply 4 to 8 oz. per acre. Begin applications when plants begin to run or when disease first appears, and repeat at 7- to 14-day intervals as needed.

MACADAMIA NUTS (HAWAII): Botrytis Blossom Blight—Apply 1½ lbs. per acre; a surfactant may be added to the spray to improve wetting of foliage. Begin applications 1 to 2 weeks prior to bloom, and repeat at 7- to 14-day intervals through the bloom period.

MANGOES: Anthracnose—Apply 1 to 2 lbs. per acre. Begin applications at first appearance of panicles (approx. 2" long), and repeat at weekly intervals until all fruits are set. Continue at 3- to 4-week intervals. Do not apply within 14 days of harvest.

MUSHROOMS: Verticillium Spot (Dry Bubble)—Use 1 lb. per 100 gals. and apply to bed surface at the rate of 12½ gals. per 1000 sq. ft. Apply immediately after casing and repeat at pinning; alternatively, if disease has occurred, apply to beds after picking and repeat 10 days later. Do not apply within 2 days of harvest.

PEANUTS: Cercospora Leafspot—Apply 6 to 8 oz. per acre. Begin application 35 to 40 days after planting or when disease first appears, and repeat at 14- to 21-day intervals as needed. Do not apply within 14 days of harvest.

[illegible]

NO-DISEASE

BENOMYL FUNGICIDE

Wettable Powder

ACTIVE INGREDIENT	
Benomyl [Methyl 1-(butylcarbamoyl)-2-benzimidazolecarbamate]	50%
INERT INGREDIENTS	50%

U.S. Pats. 3,541,213 & 3,631,176 EPA Est. 352-WV-1 EPA Reg. No. 352-354-AA

Keep out of reach of children.

CAUTION! MAY IRRITATE EYES, NOSE, THROAT, AND SKIN. Avoid breathing dust or spray mist. Avoid contact with skin, eyes, and clothing. Wash thoroughly after using. Keep away from fire or sparks.

In case of contact, flush skin or eyes with plenty of water; for eyes, get medical attention.

IMPORTANT—Never allow to become wet during storage. This may lead to certain chemical changes which will reduce the effectiveness of "Benlate" as a fungicide. Keep container closed when not in use. Do not re-use container; crush and bury when empty.

This product is toxic to fish. Keep out of lakes, streams, or ponds. Do not apply when weather conditions favor drift from areas treated. Do not contaminate water by cleaning of equipment or disposal of wastes.

NET 50 LBS.

B-21130 8-73A Made in U.S.A. Printed in U.S.A.

KILL-DEAD CHEMICALS

PECANS: Pecan Scab, Brown Leafspot, Downy Spot, Powdery Mildew—Apply ½ to 1 lb. per acre; use the higher rate for trees over 30 ft. tall. A surfactant may be added to the spray to improve wetting of foliage. Apply at prepollination when young leaves are unfolding, when small nuts are forming, and thereafter at 3- to 4-week intervals. Do not apply after shucks split.

PINEAPPLE: Pineapple Butt Rot (Thielaviopsis paradoxa)—Use 1½ lbs. per 100 gals. of water as preplant dip treatment. Immerse seedpieces to give thorough wetting; remove and allow to drain.

STONE FRUITS—APRICOTS, CHERRIES, NECTARINES, PEACHES, PLUMS, PRUNES: Apply 150 to 400 gals. of spray per acre with hydraulic ground equipment or equivalent amount of "Benlate" per acre with concentrate sprayers. Do not graze livestock in treated orchards.

Brown Rot Blossom Blight, Fruit Brown Rot—Use 1 lb. per 100 gals. (in combination with dormant oil) as a delayed dormant treatment prior to bud break. Use ½ lb. per 100 gals. at early bloom (popcorn, red bud, or green tip) and at full bloom; apply 1 or 2 additional sprays beginning 3 weeks before harvest.

For following diseases, use the same schedule as for Brown Rot plus additional applications of ½ lb. per 100 gals. as indicated: Peach Scab—shuck split and shuck fall; Powdery Mildew—shuck fall and first cover; Cherry Leaf Spot—2 to 3 weeks after harvest.

Postharvest Fruit Rots—Dip or spray fruit thoroughly as soon as possible after harvest; use ½ lb. per 100 gals. "Benlate" does not control fruit rots caused by Rhizopus spp. and Alternaria spp.

STRAWBERRIES: Gray Mold (Botrytis), Powdery Mildew, Leaf Scorch, Leaf Blight, Leaf Spot—Apply 1 lb. per acre at 10% bloom and at full bloom; continue at 10- to 14-day intervals, using ½ lb. per acre. Anthracnose—Apply 1 lb. per acre when plants are established (plant bed or field) and repeat at 7-day intervals.

SUGAR BEETS: Cercospora Leafspot—Apply 6 to 8 oz. per acre. Begin application when disease first appears and repeat at 14- to 21-day intervals as needed. Do not apply within 21 days of harvest.

SUGARCANE (HAWAII): Pineapple Disease (Ceratocystis paradoxa)—Apply to cut seedpieces either as a cold dip or hot dip.

Cold Dip—Use 8 oz. per 100 gals. of water (1:1600). Immerse seedpieces to give thorough wetting; remove and allow to drain.

Hot Dip—Use 4 oz. per 100 gals. of water (1:3200). Maintain temperature of the dip at 50°C. Soak seedpieces for 20 to 30 minutes; remove and allow to drain.

Note: Do not use treated seedpieces for food or feed purposes.

ROSES (Powdery Mildew, Black Spot); **FLOWERS, ORNAMENTALS** (Powdery Mildew, Botrytis Gray Mold): Field and Greenhouse—Use 8 oz. per 100 gals. of water (1 tablespoonful per 2 gals.); for Black Spot of roses, use 1 lb. per 100 gals. Apply when disease first appears and repeat at 10- to 14-day intervals throughout the growing season; shorten interval during humid, rainy weather. Addition of a surfactant to the spray mixture enhances curative action of the fungicide, and improves distribution of the spray on hard-to-wet plants such as roses.

BULBS (Easter Lily, Tulip, Gladiolus, Daffodil, Iris): Fusarium and Penicillium Rots—Use 1½ lbs. per 100 gals. of water (2 tablespoonfuls per gal.). Soak cleaned bulbs for 15 to 30 minutes in warm dip (80 to 85°F.), preferably within 48 hours after digging. Dry bulbs after treatment. If bulbs are for forcing, treat after bulbs have been heat-cured.

NOTICE TO BUYER—Seller warrants that this product conforms to the chemical description on the label thereof and is reasonably fit for purposes stated on such label only when used in accordance with directions under normal use conditions. This warranty does not extend to use of this product contrary to label use directions, or under abnormal use conditions, or under conditions not reasonably foreseeable to seller; buyer assumes all risk of any such use. Seller makes no other warranties, express or implied.

Purchase of this material does not confer any rights under patents of countries outside of the United States.

SAFETY BEFORE, DURING, AND FOLLOWING APPLICATION
UNIT VII

ASSIGNMENT SHEET #3--INTERPRET ANTI-WEED LABEL

The purpose of this assignment is to allow you to locate important information that must be contained on all pesticide labels. Read the label on the following page and answer the questions below. When completed, return assignment sheet to instructor for evaluation.

1. What signal words are on the label?

2. What toxicity category does it represent?

3. What protective clothing would you wear?

4. What protective equipment would you wear?

5. Should you launder your clothing following application?

ASSIGNMENT SHEET #3

Anti-Weed

20G

SAMPLE LABEL

Herbicide

FOR WEED CONTROL IN CORN

Active Ingredients: 20.0%
Atrazine: 2-chloro-4-Ethylamino-6-isopropylamino-s-triazine . . . 6.32%
Related compounds . . .34%
2-chloro-N-isopropyl-acetanilide . . 13.34%
Inert Ingredients: 80.0%
Total: 100.0%

Anti-Weed 20G is a granular herbicide

Warning:

Keep out of reach of children. See additional warning statements on back of bag.

50 Pounds
NET WEIGHT

EPA Reg. No. 1000-519

KILL-DEAD
Chemical Company

ASSIGNMENT SHEET #3

DIRECTIONS FOR USE AND CONDITIONS OF SALE AND WARRANTY

IMPORTANT: Read the entire **Directions For Use** and the **Conditions Of Sale And Warranty** before using this product.

Conditions Of Sale And Warranty

The **Directions For Use** of this product reflect the opinion of experts based on field use and tests. The directions are believed to be reliable and should be followed carefully. However, it is impossible to eliminate all risks inherently associated with use of this product. Crop injury, ineffectiveness or other unintended consequences may result because of such factors as weather conditions, presence of other materials or the manner of use or application all of which are beyond the control of or the Seller. All such risks shall be assumed by the Buyer.

warrants that this product conforms to the chemical description on the label and is reasonably fit for the purposes referred to in the **Directions For Use**, subject to the inherent risks referred to above. **makes no other express or implied warranty of Fitness or Merchantability or any other express or implied warranty.** In no case shall or the Seller be liable for consequential, special or indirect damages resulting from the use or handling of this product. and the Seller offer this product and the Buyer and user accept it, subject to the foregoing **Conditions Of Sale And Warranty** which may be varied only by agreement in writing signed by a duly authorized representative of

General Information

Anti-Weed will control most annual broadleaf and grass weeds in field corn, silage corn and sweet corn. It should be applied prior to weed and crop emergance.

Since Anti-Weed acts mainly through root absorption, its effectiveness depends on rainfall or irrigation to move it into the root zone. Best results are obtained when moisture occurs within 10 days after application. Should moisture not occur within this period or should weeds develop, a shallow cultivation or rotary hoeing will generally result in better weed control.

Anti-Weed is noncorrosive to equipment and metal surfaces, nonflammable and has low electrical conductivity.

Care should be taken to avoid using Anti-Weed where adjacent desirable trees, shrubs or plants might be injured.

Store Anti-Weed in a dry place.

Application Instructions

Broadcast or Overall Treatment
Use broadcast applicators or fertilizer spreaders that can apply small amounts of granules evenly.

Band Treatment
Use applicators designed for this purpose. Calculate the amount of granules per acre needed for band treatment as follows:

$$\frac{\text{Band Width in Inches}}{\text{Inches Between Crop Rows}} \times \begin{array}{c}\text{Recommended}\\ \text{Broadcast Rate}\end{array} = \begin{array}{c}\text{lbs./Acre}\\ \text{Anti-Weed}\\ \text{for Band}\\ \text{Treatment}\end{array}$$

Range of Rates: In each case where a range of rates is given, the lower rate should be used on soils low in organic matter and the higher rate should be used on soils high in organic matter.

Directions for Use

Anti-Weed controls most annual broadleaf and grass weeds such as:

Giant Foxtail
Green Foxtail
Yellow Foxtail
Barnyardgrass
(Watergrass)
Crabgrass

Fall Panicum
Annual Morningglory
Cocklebur
Sandbur
Jimsonweed
Lambsquarters

Mustard
Pigweed
Ragweed
Smartweed
Sunflower
Velvetleaf

Anti-Weed will not control perennial weeds such as:

Johnsongrass Field Bindweed Canada Thistle Bull Nettle

Apply Anti-Weed at planting behind the press wheel or immediately after planting prior to emergence of either crop or weeds. See table below for recommended rates.

Soil	**Rate per acre of Anti-Weed Broadcast**
Light soils: Sands, loamy sands, and sandy loams	15 lbs.
Medium to heavy soils including the dark prairie soils in the Corn Belt**	22.5– 30 lbs.

*For calculation of band treatment rate, see Application Instructions Section.

** Anti-Weed should not be used on high organic soils such as peat and muck.

Suggestions for Crop Rotations

1) Corn may be replanted at any time following application of Anti-Weed . 2) Sorghum may be seeded in all areas the spring following application of the granules. 3) Soybeans may be seeded in Louisiana, Arkansas, Missouri, Iowa and Southeastern Minnesota and areas east of these states the spring following applications made not later than June 1 of the previous year.

Precautions: 1) Do not plant sugar beets, tobacco, vegetables (including dry beans), spring-seeded small grains or small-seeded legumes and grasses the year following Anti-Weed application or injury may occur. 2) Following harvest of a treated crop, plow (moldboard or disk-plow) and thoroughly till the soil in the fall or spring to minimize possible injury to rotational spring-seeded crops. 3) Injury to rotational crops following application may occur on eroded hillsides, alkali outcroppings, gravelly areas and on soils in general with pH near or exceeding 7.5. 4) Do not graze treated area or feed treated forage to livestock for 21 days following application.

Warning

Keep out of reach of children.

Irritating to skin, eyes, nose and throat. May be harmful if swallowed. May cause allergic skin reaction. Do not get in eyes, on skin or on clothing. Avoid breathing dust. Do not take internally. While handling, wear rubber gloves. In case of contact, flush skin or eyes with plenty of water; for eyes, get medical attention. Launder clothing before reuse. Avoid contamination of seed, feed and foodstuffs.

This product is toxic to fish. Keep out of lakes, ponds and streams.

Do not reuse container. Destroy when empty.

SAFETY BEFORE, DURING, AND FOLLOWING APPLICATION
UNIT VII

ANSWERS TO ASSIGNMENT SHEETS

Assignment Sheet #1

1. Danger, Poison, Skull and Crossbones
2. Highly toxic
3. Closely woven cotton coveralls
4. Neoprene gloves and boots, waterproof hat with brim, goggles or face shield, and approved respirator
5. National Institute for Occupational Safety and Health (NIOSH) or the Mining Enforcement and Safety Administration (MESA), both formerly U.S. Bureau of Mines
6. No
7. No
8. Yes--Do not apply when weather conditions favor drift from areas treated
9. Rubber apron, neoprene gloves and boots, waterproof hat with brim, goggles or face shield, approved respirator

Assignment Sheet #2

1. Caution
2. Slightly toxic to relatively nontoxic
3. Closely woven cotton coveralls or work clothing
4. Wide-brimmed hat (optional goggles, gloves, and boots)
5. Yes--Always take shower after applying any pesticide
6. No, never!
7. Rubber apron over the coveralls, gloves, goggles; cannister respirator is optional to avoid breathing the powder or dust

Assignment Sheet #3

1. Warning
2. Moderately toxic
3. Closely woven cotton coveralls or work clothing
4. Neoprene or rubber gloves; optional hat, boots, goggles or face shield
5. Launder clothing before reuse

SAFETY BEFORE, DURING, AND FOLLOWING APPLICATION
UNIT VII

TEST

1. Match the terms on the right to the correct definitions on the left by placing the appropriate numbers in the blanks provided.

______a. Process of directing or placing pesticides on or in plants, animals, buildings, soil, air, water, or other site

______b. Metal or plastic container filled with absorbent materials to filter fumes and vapors from the air

______c. Cylinder-shaped part of the respirator which absorbs fumes and vapors from the air

______d. Portion or amount of pesticide mixture which is directed at the target

______e. Pest to be treated with a pesticide

______f. Direction toward which the prevailing wind is blowing

______g. Face mask which filters out poisonous gases and particles

______h. Movement by wind and air currents of droplets or particles of a pesticide

______i. Period of time between a pesticide application and when persons can safely go back into an area without wearing protective clothing and equipment

______j. To make unclean or unsafe

______k. Surroundings, usually water, air, soil, plants, and animals

______l. Synthetic rubber

______m. To form a gas and disappear into the air

______n. Not protected or shielded; contact with pesticides through mouth, lungs, or skin

______o. Piece of protective equipment used by pesticide applicator to protect face from exposure

______p. Unpleasant or irritating smoke, vapor, or gas

1. Target
2. Respirator
3. Reentry interval
4. Pollute
5. Cannister
6. Fume
7. Face shield
8. Vaporize
9. Environment
10. Drift
11. Downwind
12. Dose, dosage
13. Cartridge
14. Application
15. Neoprene
16. Exposure

2. Name four factors to consider before applying pesticides.

   a.

   b.

   c.

   d.

3. Discuss in a short paragraph safety steps for transporting pesticides.

4. Name factors that determine types of protective clothing and protective equipment needed.

   a.

   b.

   c.

   d.

   e.

5. Name three safety precautions used while mixing and handling concentrated pesticides.

   a.

   b.

   c.

6. Discuss in a short paragraph reasons for not applying pesticides on a windy day.

7. Name three ways to prevent exposure during application.

   a.

   b.

   c.

8. Discuss in a short paragraph what is meant by sensitive areas.

9. Select from the list below ways to avoid spills, drifts, and runoff. Place an "X" in the proper blanks.

_____a. Apply when time is available

_____b. Use proper formulation for the job

_____c. Apply right after a rain when there is plenty of soil moisture

_____d. Check equipment for leaks and proper delivery rate

_____e. Do not apply during high winds

_____f. Do not apply if rain is approaching unless the pesticide calls for it, like some protectant fungicides and some herbicides

10. Discuss in a short paragraph steps for equipment maintenance and safety.

11. Select from the list below the ideal times of day to apply pesticides. Place an "X" in the correct blanks.

_____a. At noon when temperature is adequate

_____b. Evening

_____c. Early morning

_____d. Afternoon when the humidity is high

12. Name factors to consider following application.

a.

b.

c.

d.

13. Name safety rules to follow in cleaning up after application.

a.

b.

c.

d.

14. Discuss in short paragraphs the types of protective clothing and equipment needed for pesticide applications.

a. Gloves

b. Coveralls

c. Boots

d. Goggles and face shield

e. Head and neck covering

15. Match the types of respirators on the right to the proper uses on the left. Place the appropriate numbers in the blanks. Each number may be used more than once.

______a. Use when exposed to concentrated chemicals for short periods

______b. Use when exposed to high concentrations of highly toxic pesticides in enclosed areas, such as fumigation

______c. Use when exposed to low concentration of toxic chemicals for long periods of time

______d. Use when oxygen supply in air is low

______e. Use when exposed to toxic fumes in heavy concentrations for long periods of time

1. Air-supplied respirators and self-contained air-supplied respirators

2. Gas mask or cannister respirator

3. Cartridge respirator

16. Name four safety rules for using the respirator correctly.

a.

b.

c.

d.

17. Interpret the following label by answering the questions below.

a. What signal words are on this label?

b. What toxicity category does it represent?

c. What protective clothing would you wear?

d. What protective equipment would you use?

e. After you have been applying this pesticide for awhile and you decide you want a drink, what must you do first?

PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS

(DANGER)

Poisonous by swallowing or inhalation. Do not breathe spray mist. Do not get in eyes. Avoid contact with skin. Use only when wearing the following protective equipment and clothing. Wear tightly woven cotton overalls, waterproof hat, unlined neoprene gloves and boots. Wear safety goggles and/or face shield. Wear a mask or respirator jointly approved by the Mining Enforcement and Safety Administration and by the National Institute for Occupational Safety and Health. Before removing gloves, wash them with detergent and water. Always wash hands, face and arms with detergent and water before smoking, eating or drinking. For emergency assistance, call 000-000-0000.

TO PHYSICIAN: De Pesto is a reversible cholinesterase inhibitor. Do not use oximes such as 2-PAM. Give Atropine 2 mg. intravenously or subcutaneously. If in eye, instill one drop of Homatropine. Close supervision of the patient is indicated for at least 48 hours.

ENVIRONMENTAL HAZARDS

This pesticide is toxic to wildlife and fish. Use with care when applying in areas frequented by wildlife or adjacent to any body of water. Keep out of lakes, streams or ponds. Do not apply where runoff is likely to occur. Do not apply when weather conditions favor drift from target area. Do not contaminate water by cleaning of equipment or disposal of wastes.

PHYSICAL OR CHEMICAL HAZARDS

Flammable! Keep away from heat and open flame.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

RE-ENTRY STATEMENT (IF APPLICABLE)

Do not enter area within 5 days after application.

CATEGORY OF APPLICATOR (IF APPLICABLE)

STORAGE AND DISPOSAL

STORAGE—Do not contaminate water, food, or feed by storage or disposal. Open dumping is prohibited. DISPOSAL—Pesticide, spray mixture, or rinsate that cannot be used or chemically reprocessed should be disposed of in a landfill approved for pesticides or buried in a safe place away from water supplies. Containers should be triple rinsed and offered for recycling, reconditioning, or disposal in approved landfill or buried in a safe place.

Consult Federal, State or local Disposal authorities for approved alternate procedures.

RESTRICTED USE PESTICIDE

FOR RETAIL SALE TO AND APPLICATION ONLY BY CERTIFIED APPLICATORS OR PERSONS UNDER THEIR DIRECT SUPERVISION

DE PESTO

INSECTICIDE
EMULSIFIABLE CONCENTRATE

ACTIVE INGREDIENT: pestoff—tri-salicylic acid	45.0%
INERT INGREDIENTS:	55.0%
TOTAL:	100.0%

THIS PRODUCT CONTAINS 4.0 LBS OF PESTOFF PER GALLON

KEEP OUT OF REACH OF CHILDREN

DANGER — POISON

STATEMENT OF PRACTICAL TREATMENT

IF SWALLOWED - Induce vomiting by giving a tablespoonful of salt in a glass of warm water. Repeat until vomitus is clear. Call a physician immediately.

IF INHALED - Remove to fresh air. Call a physician immediately.

IF IN EYES - Flush eyes with plenty of water for at least 15 minutes. Call a physician immediately.

IF ON SKIN - In case of contact, remove contaminated clothing and immediately wash skin with detergent and water.

SEE SIDE PANEL FOR ADDITIONAL PRECAUTIONARY STATEMENTS

MFG BY A-Z CHEMICALS
TOWN, STATE

EPA EST. NO. 1357–STATE–1
EPA REGISTRATION NO. 1357-42

NET CONTENTS ONE GALLON

DIRECTIONS FOR USE CONTINUED

METHODS OF APPLICATION: The minimum gallonage requirement is 10 gallons of finished spray per acre with ground equipment, 2 gallons per acre with aircraft.

ALFALFA: Air and Ground Application—Alfalfa Weevil Larvae, Egyptian Alfalfa Weevil Larvae, Pea Aphid, and in New York state for Snout Beetle control. Apply the amounts of De Pesto indicated in the chart, when feeding is noticed or when insects appear. Alfalfa Weevil Adult—Apply 1-2 pints per acre when insects appear. Lygus Bugs—Apply 2 pints per acre prior to bloom. Observe the indicated number of days after application before cutting or grazing. Do not apply more than once per season. Apply only to field planted to pure stands of Alfalfa.

Pints of De Pesto Per Acre	Do Not Cut or Graze Within
½	7 days
1	14 days
2	28 days

CORN, FIELD: Ground Application—Corn Rootworms—Use 1½ pints of De Pesto per 13,000 linear feet (1 acre with 40 inch spacing). Apply, at planting, as a 7 inch band over the row or inject on each side of the row by mixing with water or liquid fertilizers. When De Pesto is used with liquid fertilizers, mix in the following way making sure that the mixture is physically compatible. Premix 1 part of De Pesto with 2 parts of water. Add this premix to the tank of fertilizer along with rinsings from the premixing container. Maintain agitation in the tank after mixing and during application. Do not mix until ready to use.

SUGARCANE: Sugarcane Borer—Apply 1-1½ pints De Pesto per acre using ground or aerial equipment. Check sugarcane fields weekly, beginning in early June and continuing through August. Make first application only after visible joints form and 5% or more of the plants are infested with young larvae feeding in or under the leaf sheath and which have not bored into the stalks. Repeat whenever field checks indicate the infestation exceeds 5%. Do not apply within 17 days of harvest. Do not use in Hawaii.

ORANGES, LEMONS, GRAPEFRUIT, and TANGELOS in Arizona and California: Air and Ground application—Citrus thrips—Apply De Pesto at ½ to 1 lb. per acre. Use sufficient water to obtain thorough coverage (5 to 10 gals/acre by air). Use the higher rate on severe infestations of thrips. Apply in the early spring before bloom when the new growth is about 3 to 4 inches long. Make additional applications as needed until the new fruit is walnut size. Application at petal fall may be critical to prevent fruit scarring. Applications during mid-summer to protect new growth on young trees are also recommended.

Do not apply within 1 day of harvest. Do not graze livestock in treated orchards for 10 days after treatment.

POTATO: Tuberworm, cabbage looper, aphids, and in areas east of the Mississippi River, leafhoppers and flea beetles. Apply De Pesto at indicated rates when field checks indicate the insect infestation is above 5%. Tuberworm, cabbage looper and aphids—apply ½ to 1 lb. per acre. Leafhopper and flea beetles—apply ½ lb per acre. Do not apply within 14 days of harvest.

SAFETY BEFORE, DURING, AND FOLLOWING APPLICATION
UNIT VII

ANSWERS TO TEST

1. a. 14
   b. 5
   c. 13
   d. 12
   e. 1
   f. 11
   g. 2
   h. 10
   i. 3
   j. 4
   k. 9
   l. 15
   m. 8
   n. 16
   o. 7
   p. 6

2. Any four of the following:
   a. Transportation
   b. Climatic conditions
   c. Protective clothing and equipment
   d. Mixing and filling
   e. Reading label
   f. Equipment

3. Discussion should include:
   a. Never carry pesticides inside car or truck cab
   b. Secure containers to keep from shifting, rolling, or bouncing
   c. Never transport livestock feed, seed, or groceries in the same load with pesticides
   d. Never allow children to ride on or near pesticides

4. a. Label
   b. Toxicity of pesticide
   c. Formulation
   d. Application equipment
   e. Degree of exposure

5. Any three of the following:

   a. Use neoprene or natural rubber gloves, goggles, rubber apron, and a respirator if needed

   b. Mix only what will be used

   c. Mix according to the label

   d. Do not combine pesticides

   e. Avoid splashes, spills, and drift when opening containers

   f. Change clothes immediately in case of a splash or spill

   g. Stand with head above fill hole of spray tank

6. Discussion should include:

   a. Injury to wildlife, plants, pollinators, and domestic animals

   b. Contamination of surface water, such as ponds, streams, rivers, and lakes

   c. Increase in inhalation contact hazard to the applicator

7. Any three of the following:

   a. Wear protective clothing and equipment

   b. Do not wipe hands on clothing

   c. Never blow out clogged hoses, nozzles, or lines with your mouth

   d. Never eat, drink, or smoke when handling pesticides

   e. Work in pairs when handling hazardous pesticides or at least let someone know where you will be working

   f. Keep persons, livestock, and pets out of spray area

8. Discussion should include:

   Areas or locations of parks, playgrounds, bird and wildlife sanctuaries, ponds, streams, water supplies, barnyards, feedlots, pastures, bee yards, schools, homes, hospitals, and any other areas where out-of-place pesticides might cause harm

9. b, d, e, f

10. Discussion should include:

   a. Check for leaks in pump and tank

   b. Check for leaky hose connections and carefully dispose of worn or cracked hoses

c. Keep spray tank lid tight

d. Stay with tank during filling

e. Shut down machinery while making repairs or adjustments

f. Do not blow out clogged lines with your mouth

11. b, c

12. a. Dispose of empty containers

b. Store leftover pesticides

c. Clean up equipment

d. Determine reentry interval

13. a. Always take a shower when you finish using pesticides

b. Change spray clothing daily and separate spray clothing from family laundry

c. Launder spray clothing separately from all other clothing

d. Do not wash clothing in streams or ponds

14. Discussion should include:

a. Gloves

1) Obtain unlined, elbow length neoprene or natural rubber gloves

2) Make sure sleeves are outside your gloves

3) Discard the gloves if any holes appear

4) Wash gloves with detergent and water before removing

b. Coveralls

1) Wear clean dry cotton coveralls that cover entire body

2) Wear waterproof suit or apron when mixing highly toxic pesticides

3) Wear waterproof suit when you may be drenched during application

4) Wash clothes with detergent and water

c. Boots

1) Wear lightweight, unlined neoprene or natural rubber boots

2) Put pant legs outside of boots

3) Wash and dry boots inside and out after each use

d. Goggles and face shield

    1) Wear tight-fitting goggles or face shield

    2) Wear goggles or face shield when pouring and mixing

    3) Wash goggles or face shield after each use

    4) Wear plastic, rubber, or neoprene headband if possible

e. Head and neck covering

    1) Protect hair and skin on neck

    2) Wear waterproof wide-brimmed hats or hard hats

15. a. 3

    b. 1

    c. 3

    d. 1

    e. 2

16. Any four of the following:

    a. Make sure it fits properly on your face

    b. Check filter often

    c. Wash face piece with detergent and warm water

    d. Rinse thoroughly and dry

    e. Use only those respirators approved by the National Institute for Occupational Safety and Health (NIOSH) or the Mining Enforcement and Safety Administration (MESA), both formerly U.S. Bureau of Mines

17. a. Danger, Poison, Skull and Crossbones

    b. Highly toxic

    c. Closely woven cotton coveralls

    d. Neoprene (or natural rubber) gloves and boots, waterproof hat with brim, goggles or face shield, and an approved respirator

    e. Wash hands, face, and arms first

FORMULATION AND APPLICATION
UNIT VIII

TERMINAL OBJECTIVE

After completion of this unit, the student should be able to calculate problems determining amounts of wettable powder and emulsifiable concentrate to use. The student should be able to discuss advantages, disadvantages, and principal uses of various types of formulations and interpret labels as to type of formulation and mixing procedure when given the labels. This knowledge will be evidenced through demonstration and by scoring eighty-five percent on the unit test.

SPECIFIC OBJECTIVES

After completion of this unit, the student should be able to:

1. Match terms associated with formulation and application of pesticides to the correct definitions.
2. Match types of pesticide formulations to the correct descriptions.
3. List factors an applicator must consider when selecting a formulation.
4. Match methods of pesticide application to the correct descriptions.
5. Discuss advantages, disadvantages, and principal uses of various types of formulations.
6. Select from a list the best time to mix pesticides.
7. List in the proper sequence the procedure for mixing wettable powders.
8. List safety precautions to observe when mixing and handling pesticides.
9. Describe the importance of drift control.
10. List factors to consider in determining the application rate.
11. Calculate problems determining amounts of wettable powder to use.
12. Calculate problems determining amounts of emulsifiable concentrate to use.
13. Complete a chart of liquid and volume measures.
14. Interpret labels as to type of formulation and mixing procedure when given the labels.

FORMULATION AND APPLICATION
UNIT VIII

SUGGESTED ACTIVITIES

I. Instructor:

   A. Provide student with objective sheet.

   B. Provide student with information and assignment sheets.

   C. Make transparencies.

   D. Discuss terminal and specific objectives.

   E. Discuss information and assignment sheets.

   F. Provide student with opportunity to actually mix pesticides.

   (NOTE: Activities may be set up in a laboratory situation to allow students to determine formulation to use and to mix pesticides. Instructor may want to add additional assignment sheets using labels common to the community.)

   G. Give test.

II. Student:

   A. Read objective sheet.

   B. Read and study information sheet.

   C. Complete assignment sheets.

   D. Take test.

INSTRUCTIONAL MATERIALS

I. Objective sheet

II. Information sheet

III. Transparency masters

   A. TM 1--Types of Formulations

   B. TM 2--Methods of Application

   C. TM 3--Methods of Application (Continued)

IV. Assignment sheets

   A. Assignment Sheet #1–Calculate Spray Materials Using Wettable Powder

   B. Assignment Sheet #2–Calculate Spray Materials Using Emulsifiable Concentrate

   C. Assignment Sheet #3–Interpret Pesticide Labels as to Formulation and Mixing

V. Answers to assignment sheets

VI. Test

VII. Answers to test

FORMULATION AND APPLICATION
UNIT VIII

INFORMATION SHEET

I. Terms and definitions

   A. Formulation--Mixture of one or more active ingredients with other materials needed to make a pesticide safe and easy to store, dilute, and apply

   B. Target--Pest to be controlled with a pesticide

   C. Site--Area, building, plant, or animal to be treated with pesticide in order to protect it from or reach the target pest

   D. Compatibility--Mixing of two or more pesticides without reducing their effectiveness

   E. Concentrate--Pesticide as it is sold before diluting; usually contains a large amount of active ingredient

II. Types of formulations (Transparency 1)

   A. Aerosol (pressurized can)--Small amount of pesticide or combination of pesticides that is driven through a fine opening by a gas under pressure when the nozzle is triggered

   B. Aerosol (generator)--Low concentrate solution of pesticide; usually in an oil solution formulated especially for use in generators

   C. Dust (D)--Finely ground dry mixture combining a small amount of pesticide with an inert carrier such as talc, clay, or volcanic ash

   D. Poisonous bait (B)--Food or other substance mixed with a pesticide that will attract and be eaten by pests and cause their death

   E. Granule (G)--Dry, ready-to-use mixture of a small amount of pesticide and inert carriers with all particles larger than dust particles

   F. Low concentrate solution (S)--Solution which contains a low concentration or small amount of pesticide in a highly refined oil

      (NOTE: These are usually purchased as stock sprays and space sprays and for use in aerosol generators.)

   G. Emulsifiable concentrate solution (EC or E)--Solution which contains a high concentration or large amount of active ingredient which should be mixed with water; may contain two or more pounds of active ingredient per gallon of concentrate

INFORMATION SHEET

H. Ultra-low volume concentrate solution (ULV)--Solution which contains almost pure active ingredient; usually used without dilution

I. Flowable (F)--Very finely ground solid material which is suspended in a liquid; usually contains a high concentration or large amount of the active ingredient and must be mixed with water when applied

J. Wettable powder (WP or W)--Dry preparation which may contain a fairly high concentration (15% - 95%) of active ingredient and must be mixed with water to form a suspension when applied

K. Soluble powder (SP)--Dry preparation which contains a fairly high concentration (15% - 95%) of active ingredient that must be dissolved in water to form a solution when applied

L. Fumigant--Pesticide in the form of poisonous gas or liquid which becomes a gas when applied

III. Factors to consider in selecting a formulation

A. Effectiveness against the pest

B. Habits of the pest

(NOTE: Habits will influence whether to select a stomach, contact, systemic, or fumigant formulation.)

C. Plant, animal, or surface to be protected

D. Possible injury to the protected surface

Example: Phytotoxicity

E. Application equipment which is available

F. Danger of drift or runoff

IV. Methods of pesticide application and their descriptions (Transparencies 2 and 3)

A. Band--Application to a strip or band over or along each crop row

B. Broadcast--Uniform application to an entire specified area

C. Dip--Complete or partial immersion of a plant, animal, or object in a pesticide

D. Directed--Aiming the pesticide at a portion of a plant, animal, or structure

E. Drench--Saturation of the soil with a pesticide or oral treatment of an animal

F. Foliar--Application to the leaves of a plant, shrub, or tree

INFORMATION SHEET

G. In-furrow--Application to or in a furrow in which a crop is planted

H. Over-the-top--Application over the top of the growing plant

I. Pour-on--Pouring the pesticide along the midline of the backs of livestock

J. Sidedress--Application along the side of a crop row

K. Soil incorporation--Application to the soil followed by use of tillage implements to mix the pesticide with the soil

L. Spot treatment--Application to a small area

V. Advantages, disadvantages, and principal uses of formulations

(NOTE: See chart on the following page.)

INFORMATION SHEET

Formulation	Advantages	Disadvantages	Principal Uses
A. Aerosol (pressurized can)	Convenient; easily stored; does not lose its strength	Practical only in small areas; expensive; hazardous to children dangerous if punctured or overheated	Household; backyard; tents; small areas
B. Aerosol (in aerosol generators)	Convenient; quick acting	Drift hazard; expensive; reaches only pests present at application site	Greenhouses; buildings; barns; milkrooms; poultry houses
C. Dust	Ready to use; requires no mixing; easy to apply	Drift hazard; expensive	Spot treatment; livestock and poultry; limited foliage use
D. Poisonous bait	Ready to use; easy to apply; controls pests that move in and out of the site	Hazardous to children; pest may prefer crop or food to bait; larger pests killed; may cause odor problem	Inside buildings; fruits and vegetables; field crops
E. Granule	Ready to use; easy to apply; can be applied to target under dense foliage	Limited foliage use; expensive	Soil treatment
F. Low concentrate solution	Ready to use; requires no mixing	Fairly expensive; specialized uses	In barns; on livestock and poultry
G. Emulsifiable concentrate	High concentration; relatively inexpensive; suitable for low pressure equipment	Easy to overdose; may be hazardous to applicator; phytotoxicity	Fruits and vegetables; farm animals; field crops
H. Ultra-low volume concentrate solution	Ready to use	Phytotoxicity hazard; danger of overdosing; limited uses	Fruits and vegetables; field crops
I. Flowable	Can be mixed with water; reduces nozzle clogging	Requires agitation	Fruits and vegetables; farm animals; field crops
J. Wettable powder	Relatively inexpensive; safer than emulsifiable concentrate to use on tender foliage; easy to measure	May be hazardous to applicator; requires mechanical agitation; difficult to mix; may clog nozzles	Fruits and vegetables; farm animals; field crops
K. Soluble powder	Easy to mix and measure; no agitation required	May be hazar[illegible] to user; not a common formulation	Field crops; fruits and vegetables; farm animals
L. Fumigant	Toxic to wide range of pests; will penetrate cracks and crevices and grain	Area must be sealed; requires special protective equipment; dangerous	Inside buildings; greenhouses; farm-stored grain; soil

INFORMATION SHEET

VI. Best time to mix pesticide--Immediately before using

VII. Procedure for mixing wettable powder

- A. Fill tank half full with water
- B. Start agitator

  (NOTE: Keep agitator going at all times.)
- C. Measure out correct amount of wettable powder
- D. Add powder to a small amount of water in a clean mixing bucket
- E. Stir until well mixed

  (NOTE: This will make a *slurry*, a watery mixture of insoluble matter.)
- F. Add slurry to tank
- G. Finish filling the tank

VIII. Safety precautions when mixing and handling pesticides

- A. Follow all safety precautions stated on the label
- B. Use protective clothing and equipment as stated on the label
- C. Rinse empty containers and measuring cups to remove any residue
- D. Make sure mixes of two or more pesticides are compatible
- E. Avoid splashes, spills, and leaks

  (NOTE: Clean up any splashes, spills, or leaks.)
- F. Wash all contaminated areas on clothing or equipment
- G. Dispose of empty containers properly

  (NOTE: Other safety precautions may be added by the instructor.)

IX. Importance of drift control

- A. Is hazardous to the environment
- B. May injure wildlife
- C. Contaminates water, foliage, and pasture

D. May damage nearby crops and cause illegal residues

E. Is expensive

(NOTE: The applicator is responsible for any injury or money loss on crops due to pesticide drift onto a nontarget area.)

X. Factors to consider in determining application rate

A. Read the label; never use more than the dosage rate recommended

B. Consult an expert for less than recommended rate

XI. Determining amounts of wettable powder to use

A. Pounds per gallon

1. Formula

$$\frac{\text{Pounds of wettable powder}}{\text{Gallons of water}} \times \text{Tank capacity}$$

2. Problem--Label calls for 2 pounds of 50% WP per 100 gallons of water. Your tank holds 300 gallons

$$\frac{2}{100} \times 300 = 6 \text{ pounds per 300 gallons}$$

B. Pounds per tank

1. Formula

$$\frac{\text{Tank capacity}}{\text{Gallons applied per acre}} \times \underline{\text{Pounds per acre}}$$

2. Problem--Label calls for 3 pounds of 25% WP per acre. Your sprayer holds 50 gallons and applies 10 gallons per acre

$$\frac{50}{10} \times 3 = 15 \text{ pounds per 50 gallon tank}$$

C. Active ingredient per acre

1. Formula

$$\frac{\text{Tank capacity}}{\text{Gallons applied per acre}} \times \text{Pounds of wettable powder per acre}$$

INFORMATION SHEET

2. Problem--A local expert recommends that you apply 1/2 pound of active ingredient per acre. You have a 50% WP on hand and your sprayer tank holds 50 gallons. It applies 8 gallons per acre

   1 pound of 50% WP = 1/2 pound of active ingredient

   $\frac{50}{8} \times 1 =$ 6 1/4 pounds of 50% WP per tankful to apply 1/2 pound per acre

D. Percentage mixing

1. Formula

$$\frac{\text{Gals of spray needed} \times \text{\% active ingredient wanted} \times 8.3\# \text{ per gal of water}}{\text{\% active ingredient in pesticide used}}$$

2. Problem--A local expert recommends using a 1% spray. You already have an 80% WP of the right pesticide and you need 50 gallons of the 1% spray. How much pesticide is needed?

$$\frac{50 \text{ gallons} \times 1\% \times 8.3\#/\text{gal}}{80\% \text{ WP}} = \text{5.18 or 5.2 pounds of pesticide in 50 gallons of water}$$

XII. Determining amounts of emulsifiable concentrate

A. Pints per gallon

1. Formula

$$\frac{\text{Tank capacity}}{1} \times \frac{\text{Pints of EC}}{\text{Gallons of diluent}}$$

2. Problem--The label says to apply 1/4 pint of 8EC per 100 gallons. Your tank holds 400 gallons. How much of 8EC is needed?

$$\frac{400 \text{ gallons}}{1} \times \frac{1/4 \text{ pint}}{100 \text{ gallons}} = \text{1 pint per 400 gallons}$$

B. Pints, quarts, or gallons/acre

1. Formula

$$\frac{\text{Tank capacity}}{\text{Gallons applied per acre}} \times \text{Recommended amount of pesticide per acre}$$

INFORMATION SHEET

2. Problem--The label recommendation is to apply 2 quarts of 6E per acre. Your sprayer holds 42 gallons and applies 6 gallons per acre

$$\frac{\text{42 gallons}}{\text{6 gallons per acre}} \times \text{2 quarts per acre} = \text{14 quarts per tankful}$$

14 quarts = 3 gallons, 2 quarts per tankful or 3 1/2 gallons

C. Active ingredient per acre

1. Formula

$$\frac{\text{Tank capacity}}{\text{Gallons applied per acre}} \times \text{Amount of EC per acre}$$

2. Problem--A local expert recommends you apply 1/2 pound active ingredient per acre. You have a 4E on hand which contains 4 pounds of active ingredient per gallon formulation. Your sprayer holds 40 gallons and applies 6 gallons per acre. How much 4E is needed per tankful to apply 1/2 pound active ingredient per acre

4 pounds active ingredient per gallon = 4 pounds per 4 quarts = 1 pound per 1 quart = 1/2 pound per 1 pint

$$\frac{\text{40 gallon tank}}{\text{6 gallons per acre}} \times \text{1 pint of 4E per acre} = \text{6 2/3 pints per tankful}$$

D. Percentage mixing

1. Formula

$$\frac{\text{Gallons of spray wanted} \times \text{\% active ingredients} \times \text{8.3 pounds per gallons water}}{\text{Pounds of active ingredient per gallon of concentrate} \times 100}$$

2. Problem--A local expert tells you to apply a 0.5% spray. You already own a 25% EC (2 pounds pesticide per gallon formulation) which must be mixed with water and you need 100 gallons of spray

$$\frac{\text{100 gallons} \times 0.5\% \times 8.3}{\text{2 pounds} \times 100} = \text{2.07 or 2 gallons}$$

(NOTE: If the EC was to be mixed with oil or kerosene, you would have used 6.6 pounds per gallon not 8.3 pounds per gallon.)

INFORMATION SHEET

XIII. Liquid and volume measures

A. 1 gallon of water = 8.3 pounds (approx)

(NOTE: One gallon of kerosene weighs 6.6 lbs.)

B. 100 gallons of water = 830 pounds (approx)

C. 1 pound = 16 ounces = 453.6 grams

D. 1 pint = 16 fluid ounces = 473 milliliters

E. 1 quart = 2 pints = 32 fluid ounces = 946 milliliters = .946 liters

F. 1 pound wettable powder per 100 gallons = 1 tablespoon per gallon (approx)

G. 1 pint emulsifiable concentrate per 100 gallons = 1 teaspoon per gallon (approx)

(NOTE: Instructor may want to add additional measures.)

Types of Formulations

Dry

- Dust (D)
- Poisonous Bait (B)
- Granule (G)
- Wettable Powder (WP or W)
- Soluble Powder (SP)

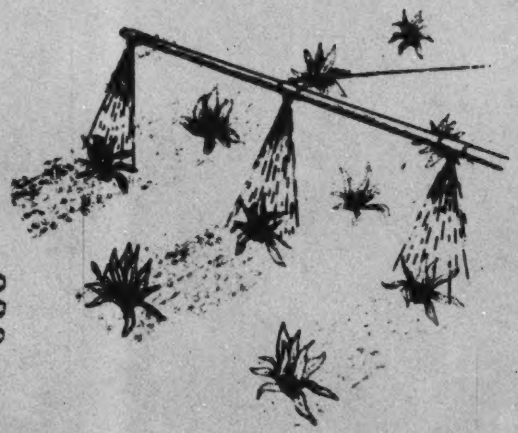
Gas

- Fumigant

Solutions

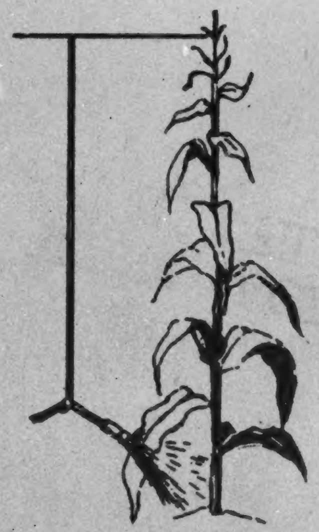
- Aerosol (Pressurized Can)
- Aerosol (Generator)
- Low Concentrate Solution (S)
- Emulsifiable Concentrate Solution (EC or E)
- Ultra-Low Volume Concentrate Solution (ULV)
- Flowable (F)

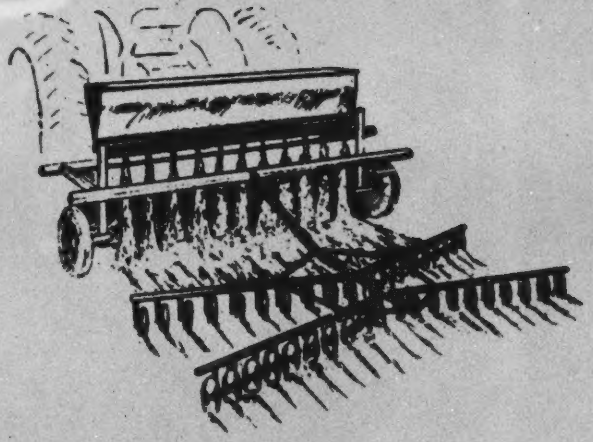
Methods of Application



Band

Directed

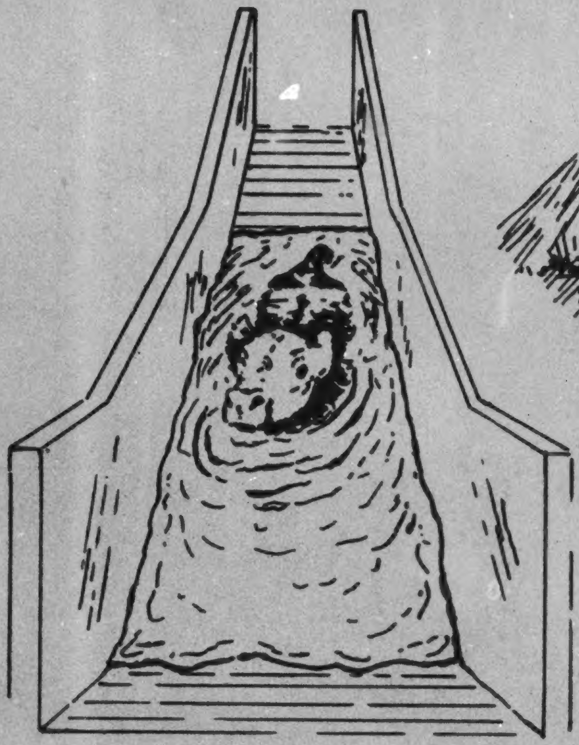




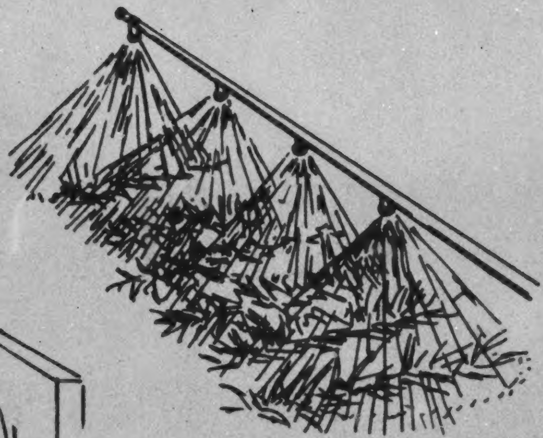
Soil Incorporation

Methods of Application

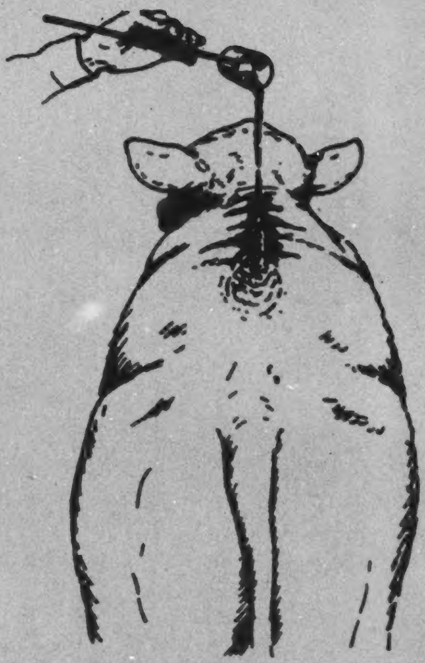
(Continued)



Dipping



Broadcast



Pour-On

FORMULATION AND APPLICATION
UNIT VIII

ASSIGNMENT SHEET #1--CALCULATE SPRAY MATERIALS USING WETTABLE POWDER

Calculate the problems below and show your work. Use the formulas provided to work the problems.

1. A farmer wants to spray a field of corn. The recommended strength of the spray is 0.5%. The wettable powder recommended is 50% and the spray tank holds 150 gallons. How much 50% WP is required for this mix?

$$\frac{\text{Gallons of spray wanted} \times \text{\% active ingredient needed} \times 8.3 \text{ pounds/gallon}}{\text{\% active ingredient in pesticide used}}$$

2. How many pounds of wettable powder is needed to make 100 gallons of spray if 3 pounds of 60% wettable powder is needed per acre and your sprayer applies 25 gallons per acre?

$$\frac{\text{Tank capacity}}{\text{Gallons applied per acre}} \times \text{Pounds per acre}$$

3. How much wettable powder is needed to make 200 gallons of spray if recommended rate is 3 pounds per 50 gallons of water?

$\frac{\text{Pounds of WP}}{\text{Gallons of water}}$ x Tank capacity

FORMULATION AND APPLICATION
UNIT VIII

ASSIGNMENT SHEET #2–CALCULATE SPRAY MATERIALS USING EMULSIFIABLE CONCENTRATE

Calculate the problems below and show your work. Use the formulas provided to work the problems.

1. A farmer wants to mix 200 gallons of 0.3% spray using 50% emulsifiable concentrate (4 pounds pesticide per gallon). How many gallons of concentrate will be needed?

$$\frac{\text{Gallons of spray wanted} \times \text{\% active ingredient} \times 8.3 \text{ pounds per gallon}}{\text{Pounds of active ingredient per gallon of concentrate} \times 100}$$

2. How many pints of 8EC is needed for 400 gallons of spray if recommended rate is 1/2 pint per 100 gallons of water?

$$\frac{\text{Tank capacity}}{1} \quad \times \quad \frac{\text{Pints of EC}}{\text{Gallons of water}}$$

3. How many quarts of 6E is needed to mix 40 gallons if recommended amount is 2 quarts per acre and your sprayer applies 4 gallons per acre?

$$\frac{\text{Tank capacity}}{\text{Gallons applied per acre}} \quad \times \quad \text{Recommended amount of pesticide per acre}$$

FORMULATION AND APPLICATION
UNIT VIII

ASSIGNMENT SHEET #3--INTERPRET PESTICIDE LABELS AS TO FORMULATION AND MIXING

Read the labels provided on the following pages and answer the questions below.

1. Using the De Metho label, answer the questions below.
    a. What type of formulation is De Metho?
    b. What is the symbol for the formulation?
    c. Does this formulation go on as is or must it be diluted? If diluted, with what?
    d. How many pounds per gallon of this formulation is active ingredient (methomyl)?
    e. How would you prepare the spray mix using this formulation?
    f. Your tank holds 200 gallons and you want to spray your chrysanthemums which have a severe infestation of cabbage looper.
        1) How many pints of De Metho is needed per 100 gallons?
        2) How much pesticide would you put into your tank?
    g. A local expert recommends that in your area you need a 0.1% spray for cabbage loopers attacking your potatoes. Using the following formula, calculate how many gallons of De Metho you need for 200 gallons of 0.1% spray.

$$\frac{\text{Gals of spray wanted} \times \text{\% active ingredient wanted} \times 8.3\#/\text{gal}}{\text{Pounds of active ingredient per gallon of concentrate} \times 100}$$

2. Using the No-Disease label, answer the questions below.
    a. What type of formulation is No-Disease?
    b. What is the symbol for this formulation?

c. How many pounds of active ingredient (benomyl) are in the formulation?

d. Does this formulation go on as is or is it diluted?

e. How do you prepare the spray mix using this formulation?

f. Your tank holds 400 gallons and applies 40 gallons per acre. You want to spray your snapbeans for an expected severe infestation of white rot.

   1) What rate would you use?

   2) How many acres can your sprayer cover before having to refill?

   3) How much would you put into your tank?

g. A local expert recommends that you need 1/8 pound active ingredient per acre to get good control of powdery mildew on your melons. Your sprayer holds 400 gallons and applies 40 gallons per acre. How much pesticide would you add to the tank?

3. Using the Anti-Weed label, answer the following questions.

   a. What formulation is Anti-Weed?

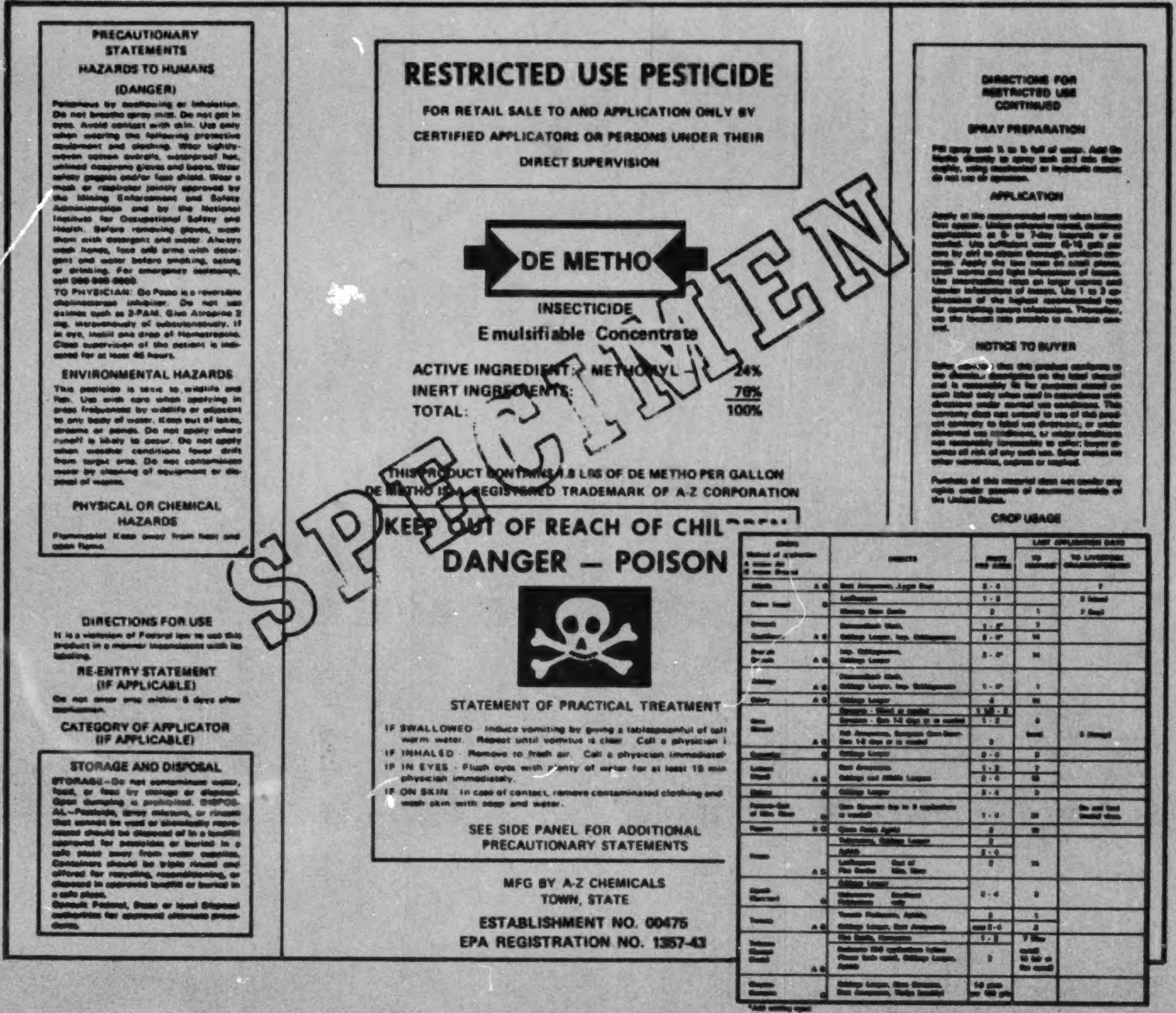
   b. What is the symbol for this formulation?

   c. Does this go on as is or is it diluted?

   d. How many pounds of actual ingredient per 50 pounds of Anti-Weed?

   e. How would you prepare this formulation in a mix?

ASSIGNMENT SHEET #3



SPECIMEN

PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS

(DANGER)

ENVIRONMENTAL HAZARDS

PHYSICAL OR CHEMICAL HAZARDS

DIRECTIONS FOR USE

RE-ENTRY STATEMENT (IF APPLICABLE)

CATEGORY OF APPLICATOR (IF APPLICABLE)

STORAGE AND DISPOSAL

RESTRICTED USE PESTICIDE

FOR RETAIL SALE TO AND APPLICATION ONLY BY CERTIFIED APPLICATORS OR PERSONS UNDER THEIR DIRECT SUPERVISION

DE METHO

INSECTICIDE

Emulsifiable Concentrate

ACTIVE INGREDIENT: METHOMYL —	24%
INERT INGREDIENTS:	76%
TOTAL:	100%

THIS PRODUCT CONTAINS [illegible] LBS OF DE METHO PER GALLON

DE METHO IS A REGISTERED TRADEMARK OF A-Z CORPORATION

KEEP OUT OF REACH OF CHIL

DANGER — POISON

STATEMENT OF PRACTICAL TREATMENT

IF SWALLOWED - Induce vomiting by giving a tablespoonful of salt in warm water. Repeat until vomitus is clear. Call a physician i

IF INHALED - Remove to fresh air. Call a physician immediatel

IF IN EYES - Flush eyes with plenty of water for at least 15 min physician immediately.

IF ON SKIN - In case of contact, remove contaminated clothing and wash skin with soap and water.

SEE SIDE PANEL FOR ADDITIONAL PRECAUTIONARY STATEMENTS

MFG BY A-Z CHEMICALS
TOWN, STATE

ESTABLISHMENT NO. 00475
EPA REGISTRATION NO. 1357-43

DIRECTIONS FOR RESTRICTED USE CONTINUED

SPRAY PREPARATION

APPLICATION

NOTICE TO BUYER

CROP USAGE

ASSIGNMENT SHEET #3

DIRECTIONS

Benlate® Benomyl Fungicide should be used only in accordance with recommendations on this label, or in separate published Du Pont recommendations available through local dealers.

Fungicide is recommended for the control of many important plant diseases. As a foliar treatment, it provides systemic, curative (eradicant), and protective action. If treatment is not effective following use of as recommended, a tolerant strain of fungi may be present (contact your representative); consideration should be given to prompt use of other suitable fungicides.

Apply as a spray (except as otherwise directed), using sufficient water to obtain thorough coverage of the plants. For aerial application (peanuts and sugar beets only), use 5 to 10 gals. per acre. Under severe disease conditions, use the higher rate and shorter interval specified for each crop; also, for tree crops, use the higher rate for large mature trees.

Add required amount of to a partially filled spray tank agitated by hydraulic or mechanical means; continuous agitation is required to keep the material in suspension. Do not use alkaline pesticides, such as basic copper sulfate, Bordeaux mixture, or lime sulfur, as a tank mixture with

ALMONDS: Brown Rot Blossom Blight—Apply 1 to 1½ lbs. per acre at pink bud. Under severe disease conditions and on highly susceptible varieties, make a second application during half to full bloom.

APPLES, PEARS: Apply 200 to 500 gals. of spray per acre with hydraulic ground equipment or equivalent amount of "Benlate" per acre with concentrate sprayers. Do not graze livestock in treated orchards.

Scab (Apples), Powdery Mildew, Sooty Blotch, Flyspeck—Use 4 to 6 oz. per 100 gals. at ¼" green tip and repeat at 7- to 14-day intervals (or as needed) through the cover sprays. If an application is missed and an infection period has occurred, apply 6 oz. per 100 gals. as soon as possible after the infection period in order to deactivate scab and to prevent further infection. With Golden Delicious apples, adverse effects on fruit finish and color may result; if finish and color are of primary importance, do not use more than 4 oz. per 100 gals.

Postharvest Fruit Rots (Botrytis sp., Penicillium sp., Gloeosporium sp.)—Make a single application of 6 oz. per 100 gals. 1 to 3 weeks before harvest. For additional protection of fruit to be held in storage, thoroughly wet harvested fruit by dipping or spraying at 8 oz. per 100 gals.

Overwintering Scab (Apples)—Apply 8 oz. per 100 gals. after harvest but before leaf drop. Thorough wetting of foliage is necessary.

BEANS (SNAP): White Mold (Sclerotinia), Gray Mold (Botrytis)—Apply 1½ to 2 lbs. per acre at 25% to 50% bloom; repeat at peak bloom. Do not apply within 14 days of harvest; do not graze or feed treated bean vines or hay to livestock.

CUCURBITS—CUCUMBERS, MELONS, SUMMER AND WINTER SQUASH: Gummy Stem Blight, Powdery Mildew, Anthracnose—Apply 4 to 8 oz. per acre. Begin applications when plants begin to run or when disease first appears, and repeat at 7- to 14-day intervals as needed.

MACADAMIA NUTS (HAWAII): Botrytis Blossom Blight—Apply 1½ lbs. per acre; a surfactant may be added to the spray to improve wetting of foliage. Begin applications 1 to 2 weeks prior to bloom, and repeat at 7- to 14-day intervals through the bloom period.

MANGOES: Anthracnose—Apply 1 to 2 lbs. per acre. Begin applications at first appearance of panicles (approx. 2" long), and repeat at weekly intervals until all fruits are set. Continue at 3- to 4-week intervals. Do not apply within 14 days of harvest.

MUSHROOMS: Verticillium Spot (Dry Bubble)—Use 1 lb. per 100 gals. and apply to bed surface at the rate of 12½ gals. per 1000 sq. ft. Apply immediately after casing and repeat at pinning; alternatively, if disease has occurred, apply to beds after picking and repeat 10 days later. Do not apply within 2 days of harvest.

PEANUTS: Cercospora Leafspot—Apply 6 to 8 oz. per acre. Begin application 35 to 40 days after planting or when disease first appears, and repeat at 14- to 21-day intervals as needed. Do not apply within 14 days of harvest.

CONTINUED ON OTHER PANEL.

NO-DISEASE

[redacted]

Wettable Powder

ACTIVE INGREDIENT
Benomyl [Methyl 1-(butylcarbamoyl)-2-benzimidazolecarbamate] 50%
INERT INGREDIENTS 50%

U.S. Pats. [illegible] EPA Est. [illegible] EPA Reg. No. [illegible]

Keep out of reach of children.

CAUTION! MAY IRRITATE EYES, NOSE, THROAT, AND SKIN
Avoid breathing dust or spray mist. Avoid contact with skin, eyes, and clothing. Wash thoroughly after using. Keep away from fire or sparks.

In case of contact, flush skin or eyes with plenty of water; for eyes, get medical attention.

IMPORTANT—Never allow to become wet during storage. This may lead to certain chemical changes which will reduce the effectiveness of "Benlate" as a fungicide. Keep container closed when not in use. Do not re-use container; crush and bury when empty.

This product is toxic to fish. Keep out of lakes, streams, or ponds. Do not apply when weather conditions favor drift from areas treated. Do not contaminate water by cleaning of equipment or disposal of wastes.

NET 50 LBS.

B-21190 6-73A

Made in U.S.A. Printed in U.S.A.

KILL-DEAD CHEMICALS

PECANS: Pecan Scab, Brown Leafspot, Downy Spot, Powdery Mildew—Apply ½ to 1 lb. per acre; use the higher rate for trees over 30 ft. tall. A surfactant may be added to the spray to improve wetting of foliage. Apply at prepollination when young leaves are unfolding, when small nuts are forming, and thereafter at 3- to 4-week intervals. Do not apply after shucks split.

PINEAPPLE: Pineapple Butt Rot (Thielaviopsis paradoxa)—Use 1½ lbs. per 100 gals. of water as preplant dip treatment. Immerse seedpieces to give thorough wetting; remove and allow to drain.

STONE FRUITS—APRICOTS, CHERRIES, NECTARINES, PEACHES, PLUMS, PRUNES: Apply 150 to 400 gals. of spray per acre with hydraulic ground equipment or equivalent amount of "Benlate" per acre with concentrate sprayers. Do not graze livestock in treated orchards.

Brown Rot Blossom Blight, Fruit Brown Rot—Use 1 lb. per 100 gals. (in combination with dormant oil) as a delayed dormant treatment prior to bud break. Use ½ lb. per 100 gals. at early bloom (popcorn, red bud, or green tip) and at full bloom; apply 1 or 2 additional sprays beginning 3 weeks before harvest.

For following diseases, use the same schedule as for Brown Rot plus additional applications of ½ lb. per 100 gals. as indicated: Peach Scab—shuck split and shuck fall. Powdery Mildew—shuck fall and first cover; Cherry Leaf Spot—2 to 3 weeks after harvest.

Postharvest Fruit Rots—Dip or spray fruit thoroughly as soon as possible after harvest; use ½ lb. per 100 gals. "Benlate" does not control fruit rots caused by Rhizopus spp. and Alternaria spp.

STRAWBERRIES: Gray Mold (Botrytis), Powdery Mildew, Leaf Scorch, Leaf Blight, Leaf Spot—Apply 1 lb. per acre at 10% bloom and at full bloom; continue at 10- to 14-day intervals, using ½ lb. per acre. Anthracnose—Apply 1 lb. per acre when plants are established (plant bed or field) and repeat at 7-day intervals.

SUGAR BEETS: Cercospora Leafspot—Apply 6 to 8 oz. per acre. Begin application when disease first appears and repeat at 14- to 21-day intervals as needed. Do not apply within 21 days of harvest.

SUGARCANE (HAWAII): Pineapple Disease (Ceratocystis paradoxa)—Apply to cut seedpieces either as a cold dip or hot dip.

Cold Dip—Use 8 oz. per 100 gals. of water (1:1600). Immerse seedpieces to give thorough wetting; remove and allow to drain.

Hot Dip—Use 4 oz. per 100 gals. of water (1:3200). Maintain temperature of the dip at 50°C. Soak seedpieces for 20 to 30 minutes; remove and allow to drain.

Note: Do not use treated seedpieces for food or feed purposes.

ROSES (Powdery Mildew, Black Spot), **FLOWERS, ORNAMENTALS** (Powdery Mildew, Botrytis Gray Mold): Field and Greenhouse—Use 8 oz. per 100 gals. of water (1 tablespoonful per 2 gals.); for Black Spot of roses, use 1 lb. per 100 gals. Apply when disease first appears and repeat at 10- to 14-day intervals throughout the growing season; shorten interval during humid, rainy weather. Addition of a surfactant to the spray mixture enhances curative action of the fungicide, and improves distribution of the spray on hard-to-wet plants such as roses.

BULBS (Easter Lily, Tulip, Gladiolus, Daffodil, Iris): Fusarium and Penicillium Rots—Use 1½ lbs. per 100 gals. of water (2 tablespoonfuls per gal.). Soak cleaned bulbs for 15 to 30 minutes in warm dip (80 to 85°F.), preferably within 48 hours after digging. Dry bulbs after treatment. If bulbs are for forcing, treat after bulbs have been heat-cured.

NOTICE TO BUYER—Seller warrants that this product conforms to the chemical description on the label thereof and is reasonably fit for purposes stated on such label only when used in accordance with directions under normal use conditions. This warranty does not extend to use of this product contrary to label use directions, or under abnormal use conditions, or under conditions not reasonably foreseeable to seller; buyer assumes all risk of any such use. Seller makes no other warranties, express or implied.

Purchase of this material does not confer any rights under patents of countries outside of the United States.

ASSIGNMENT SHEET #3

Anti-Weed

20G

SAMPLE LABEL

Herbicide

FOR WEED CONTROL IN CORN

50 Pounds

NET WEIGHT

Active Ingredients: 20.0%
Atrazine: 2-chloro-4-Ethylamino-6-isopropylamino-s-triazine . . . 6.32%
Related compounds . . .34%
2-chloro-N-isopropyl-acetanilide . .13.34%
Inert Ingredients: 80.0%
Total: 100.0%

EPA Reg. No. 1000-519

Anti-Weed 20G is a granular herbicide

Warning:

Keep out of reach of children. See additional warning statements on back of bag.

KILL-DEAD

Chemical Company

ASSIGNMENT SHEET #3

DIRECTIONS FOR USE AND CONDITIONS OF SALE AND WARRANTY

IMPORTANT: Read the entire **Directions For Use** and the **Conditions Of Sale And Warranty** before using this product.

Conditions Of Sale And Warranty

The **Directions For Use** of this product reflect the opinion of experts based on field use and tests. The directions are believed to be reliable and should be followed carefully. However, it is impossible to eliminate all risks inherently associated with use of this product. Crop injury, ineffectiveness or other unintended consequences may result because of such factors as weather conditions, presence of other materials or the manner of use or application all of which are beyond the control of or the Seller. All such risks shall be assumed by the Buyer.

warrants that this product conforms to the chemical description on the label and is reasonably fit for the purposes referred to in the **Directions For Use**, subject to the inherent risks referred to above. makes no other express or implied warranty of Fitness or Merchantability or any other express or implied warranty. In no case shall or the Seller be liable for consequential, special or indirect damages resulting from the use or handling of this product. and the Seller offer this product and the Buyer and user accept it, subject to the foregoing **Conditions Of Sale And Warranty** which may be varied only by agreement in writing signed by a duly authorized representative of

General Information

Anti-Weed will control most annual broadleaf and grass weeds in field corn, silage corn and sweet corn. It should be applied prior to weed and crop emergence.

Since Anti-Weed acts mainly through root absorption, its effectiveness depends on rainfall or irrigation to move it into the root zone. Best results are obtained when moisture occurs within 10 days after application. Should moisture not occur within this period or should weeds develop, a shallow cultivation or rotary hoeing will generally result in better weed control.

Anti-Weed is noncorrosive to equipment and metal surfaces, nonflammable and has low electrical conductivity.

Care should be taken to avoid using Anti-Weed where adjacent desirable trees, shrubs or plants might be injured.

Store Anti-Weed in a dry place.

Application Instructions

Broadcast or Overall Treatment

Use broadcast applicators or fertilizer spreaders that can apply small amounts of granules evenly.

Band Treatment

Use applicators designed for this purpose. Calculate the amount of granules per acre needed for band treatment as follows:

$$\frac{\text{Band Width in Inches}}{\text{Inches Between Crop Rows}} \times \text{Recommended Broadcast Rate} = \text{lbs./Acre Anti-Weed for Band Treatment}$$

Range of Rates: In each case where a range of rates is given, the lower rate should be used on soils low in organic matter and the higher rate should be used on soils high in organic matter.

Directions for Use

Anti-Weed controls most annual broadleaf and grass weeds such as:

Giant Foxtail
Green Foxtail
Yellow Foxtail
Barnyardgrass (Watergrass)
Crabgrass
Fall Panicum
Annual Morningglory
Cocklebur
Sandbur
Jimsonweed
Lambsquarters
Mustard
Pigweed
Ragweed
Smartweed
Sunflower
Velvetleaf

Anti-Weed will not control perennial weeds such as:

Johnsongrass Field Bindweed Canada Thistle Bull Nettle

Apply Anti-Weed at planting behind the press wheel or immediately after planting prior to emergence of either crop or weeds. See table below for recommended rates.

Soil	Rate per acre of Anti-Weed Broadcast
Light soils: Sands, loamy sands, and sandy loams	15 lbs.
Medium to heavy soils including the dark prairie soils in the Corn Belt**	22.5–30 lbs.

*For calculation of band treatment rate, see Application Instructions Section.

** Anti-Weed should not be used on high organic soils such as peat and muck.

Suggestions for Crop Rotations

1) Corn may be replanted at any time following application of Anti-Weed . 2) Sorghum may be seeded in all areas the spring following application of the granules. 3) Soybeans may be seeded in Louisiana, Arkansas, Missouri, Iowa and Southeastern Minnesota and areas east of these states the spring following applications made not later than June 1 of the previous year.

Precautions: 1) Do not plant sugar beets, tobacco, vegetables (including dry beans), spring-seeded small grains or small-seeded legumes and grasses the year following Anti-Weed application or injury may occur. 2) Following harvest of a treated crop, plow (moldboard or disk-plow) and thoroughly till the soil in the fall or spring to minimize possible injury to rotational spring-seeded crops. 3) Injury to rotational crops following application may occur on eroded hillsides, alkali outcroppings, gravelly areas and on soils in general with pH near or exceeding 7.5. 4) Do not graze treated area or feed treated forage to livestock for 21 days following application.

Warning

Keep out of reach of children.

Irritating to skin, eyes, nose and throat. May be harmful if swallowed. May cause allergic skin reaction. Do not get in eyes, on skin or on clothing. Avoid breathing dust. Do not take internally. While handling, wear rubber gloves. In case of contact, flush skin or eyes with plenty of water; for eyes, get medical attention. Launder clothing before reuse. Avoid contamination of seed, feed and foodstuffs.

This product is toxic to fish. Keep out of lakes, ponds and streams.

Do not reuse container. Destroy when empty.

FORMULATION AND APPLICATION
UNIT VIII

ANSWERS TO ASSIGNMENT SHEETS

Assignment Sheet #1

1. 12.45 pounds or 12 1/2 pounds
2. 12 pounds
3. 12 pounds

Assignment Sheet #2

1. 1.25 gallons
2. 2 pints
3. 20 quarts

Assignment Sheet #3

1.
   a. Emulsifiable concentrate
   b. EC or E
   c. Diluted with water
   d. 1.8 pounds
   e. Fill spray tank 1/4 to 1/2 full of water. Add correct amount of De Metho directly to spray tank and mix thoroughly, using mechanical or hydraulic means. Fill spray tank the rest of the way. Do not use air agitation.
   f. 1) 2 pints/100 gallons
      2) 4 pints or 2 quarts
   g. One gallon
2.
   a. Wettable powder
   b. WP or W
   c. 50% of 50 pounds = 25 pounds
   d. Diluted

e. Fill tank 1/2 full with water. Start agitator. Measure the correct amount of WP and add to a small amount of water in a clean mixing bucket; stir until well mixed. Add slurry to tank. Finish filling the tank with water.

f. 1) 2 pounds per acre

   2) 10 acres

   3) 20 pounds per tankful

g. 2 1/2 pounds of No-Disease

3. a. Granular

   b. G

   c. As is

   d. 20% of 50 = 10 pounds

   e. You would not mix

FORMULATION AND APPLICATION
UNIT VIII

TEST

1. Match the terms on the right to the correct definition.

_____a. Area, building, plant, or animal to be treated with pesticide in order to protect it from or reach the target pest

_____b. Pesticide as it sold before diluting; usually contains a large amount of active ingredient

_____c. Pest to be controlled with a pesticide

_____d. Mixture of one or more active ingredients with other materials needed to make a pesticide safe and easy to store, dilute, and apply

_____e. Mixing of two or more pesticides without reducing their effectiveness

1. Formulation
2. Target
3. Site
4. Compatibility
5. Concentrate

2. Match the types of pesticide formulations on the right to the correct description.

_____a. Dry preparation which may contain a fairly high concentration (15% - 95%) of active ingredient and must be mixed with water to form a suspension when applied

_____b. Small amount of pesticide or combination of pesticides that is driven through a fine opening by a gas under pressure when the nozzle is triggered

_____c. Dry preparation which contains a fairly high concentration (15% - 95%) of active ingredient that must be dissolved in water to form a solution when applied

_____d. Low concentrate solution of pesticide; usually in an oil solution formulated especially for use in generators

1. Aerosol (pressurized can)
2. Aerosol (generator)
3. Dust (D)
4. Poisonous bait (B)
5. Granule (G)
6. Low concentrate solution (S)
7. Emulsifiable concentrate solution (EC or E)

_____e. Pesticide in the form of poisonous gas or liquid which becomes a gas when applied

_____f. Finely ground dry mixture combining a small amount of pesticide with an inert carrier such as talc, clay, or volcanic ash

_____g. Very finely ground solid material which is suspended in a liquid; usually contains high concentration or large amount of the active ingredient and must be mixed with water when applied

_____h. Food or other substance mixed with a pesticide that will attract and be eaten by pests and cause their death

_____i. Dry, ready-to-use mixture of a small amount of pesticide and inert carriers with all particles larger than dust particles

_____j. Solution which contains almost pure active ingredient; usually used without dilution

_____k. Solution which contains a high concentration or large amount of active ingredient which should be mixed with water; may contain two or more pounds of active ingredient per gallon of concentrate

_____l. Solution which contains a low concentration or small amount of pesticide in a highly refined oil

8. Ultra-low volume concentrate solution (ULV)
9. Flowable (F)
10. Wettable powder (WP or W)
11. Soluble powder (SP)
12. Fumigant

3. List two factors an applicator must consider when selecting a formulation.

a.

b.

4. Match the methods of pesticide application on the right to the correct description.

_____a. Complete or partial immersion of a plant, animal, or object in a pesticide

_____b. Application to a small area

_____c. Aiming the pesticide at a portion of a plant, animal, or structure

1. Band
2. Broadcast
3. Dip
4. Directed

______d. Application to the soil followed by use of tillage implements to mix the pesticide with the soil

______e. Saturation of the soil with a pesticide or oral treatment of an animal

______f. Application along the side of a crop row

______g. Application to the leaves of a plant, shrub, or tree

______h. Pouring the pesticide along the midline of the backs of livestock

______i. Application to a strip or band over or along each crop row

______j. Application over the top of the growing plant

______k. Uniform application to an entire specified area

______l. Application to or in a furrow in which a crop is planted

5. Drench
6. Foliar
7. In-furrow
8. Over-the-top
9. Pour-on
10. Sidedress
11. Soil incorporation
12. Spot treatment

5. Discuss the advantages, disadvantages, and principal uses of the following formulations.

Formulation	Advantages	Disadvantages	Principal Uses
a. Dust			
b. Emulsifiable concentrate			
c. Wettable powder			

6. Select from the list below the best time to mix pesticides by placing an "X" in the blank.

______a. 24 hours before using

______b. 48 hours before using

______c. Immediately before using

______d. 6 weeks before using

7. List in the proper sequence the procedure for mixing wettable powders.

a.

b.

c.

d.

e.

f.

g.

8. List three safety precautions to observe when mixing and handling pesticides.

a.

b.

c.

9. Describe the importance of drift control.

10. List two factors to consider in determining the application rate.

a.

b.

11. Calculate the problem on the following page to determine amounts of wettable powder to use. Use the formula below and show your work.

$$\frac{\text{Gals of spray needed} \times \text{\% active ingredient wanted} \times 8.3\# \text{ per gallon of water}}{\text{\% active ingredient in pesticide used}}$$

Problem: A local expert recommended using a 0.2% spray. You have on hand a 50% wettable powder of the right pesticide and you need 75 gallons of the spray. How much pesticide is needed?

12. Calculate the problem below determining amounts of emulsifiable concentrate to use. Use the following formula and show your work.

$$\frac{\text{Tank capacity}}{\text{Gallons applied per acre}} \times \text{Recommended amount of pesticide per acre}$$

Problem: The label recommends using 3 pints per acre of 6E. Your sprayer holds 60 gallons and applies 6 gallons per acre. How much 6E is needed?

13. Complete the following chart of liquid and volume measures.

a. 1 gallon of water = __________ pounds (approx)

b. 1 pint = __________ fluid ounces = 473 milliliters

c. 1 quart = __________ pints = 32 fluid ounces = 946 milliliters

d. 1 pound wettable powder per 100 gallons = __________ tablespoon per gallon (approx)

14. Interpret the De Weed label provided on the following page and answer the questions below.

  a. What is the type of formulation?

  b. What is the symbol for the formulation?

  c. With what do you dilute this formulation?

  d. How many pounds of active ingredient are in this formulation?

  e. Your sprayer holds 300 gallons and applies 30 gallons per acre. You have quack grass in your blueberries and want to make one application to get rid of it.

    1) How many acres can your sprayer cover without having to refill?

    2) What dose (rate) would you use?

    3) How much pesticide would you measure into your tank?

PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS

(CAUTION)

Harmful if swallowed. Avoid application directly to humans. Care should be taken to avoid inhalation of dust or spray mist, or prolonged contact with skin. In case of contact, immediately flush eyes or skin with large amounts of water. Get medical attention if irritation persists. Wear safety goggles or face shield when handling.

ENVIRONMENTAL HAZARDS

Keep out of lakes, streams, or ponds. Do not apply when weather conditions favor drift from target area.

DIRECTIONS FOR USE GENERAL CLASSIFICATION

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

STORAGE AND DISPOSAL

Do not contaminate water, food or feed by storage or disposal. Open dumping is prohibited. Pesticide, spray mixture, or rinsate that cannot be used or chemically reprocessed should be disposed of in a landfill approved for pesticides or buried in a safe place away from water supplies. Containers should be disposed of in an incinerator or landfill approved for pesticide containers, or buried in a safe place. Consult Federal, State, or local disposal authorities for approved alternate procedures such as limited open burning.

DE WEED

HERBICIDE
WETTABLE POWDER

ACTIVE INGREDIENT:	weedout · tri-azoic acid	80.0%
INERT INGREDIENTS:		20.0%
TOTAL:		100.0%

KEEP OUT OF REACH OF CHILDREN

CAUTION

STATEMENT OF PRACTICAL TREATMENT

IF SWALLOWED Induce vomiting
IF INHALED Remove to fresh air
IF IN EYES Flush eyes with plenty of water
IF ON SKIN Remove clothing and wash with detergent and water.

MFG BY A-Z CHEMICALS
TOWN, STATE

EPA ESTABLISHMENT NO. 1357–STATE–1
EPA REGISTRATION NO. 1357-41

DIRECTIONS FOR USE CONTINUED

DeWeed is for weed control in certain crops, ornamental plantings, on industrial sites, and around-the-farm. It should be applied before weeds emerge or following removal of weed growth. It controls a wide variety of annual broadleaf and grass weeds when used at selective rates in agricultural crops and ornamental plantings. When used at higher, non-selective rates in non crop areas, it also controls many perennial broadleaf and grass weeds.

GROUND APPLICATION: Use conventional spray equipment with 80° flat-fan nozzles. Screens in spray system should be no finer than 50 mesh. Use a pump with capacity to maintain 35-40 psi at nozzles. Use hydraulic or mechanical agitation during mixing and application to maintain a uniform suspension. Aerial application: Use only where specified in the use directions.

BLUEBERRIES and CANEBERRIES (blackberries, boysenberries, loganberries, raspberries)—Quackgrass. Apply 5 lbs per acre in the fall or split the application applying 2½ lbs per acre in the fall plus 2½ lbs per acre in the spring, when quackgrass is growing. Do not apply when fruit is present.

ALFALFA—Pure alfalfa less than one year old (Northeastern U.S. only)—Henbit, wild mustard, chickweed, alyssum, downy brome, wild oats, and pigweed. Pure alfalfa which has been seeded in the spring (before June 1) may be treated in the fall after the last cutting but before frozen ground conditions. Apply 1 lb. of De Weed per acre. For ground application apply in a minimum of 2½ gals. of water per acre.

GRASSES GROWN FOR SEED (Pacific Northwest only). Perennial ryegrass, tall fescue and fine fescue, such as Pennlawn, Chewings, Rainier, and related species. Control of broadleaf weeds and annual grasses including annual ryegrass, rattail fescue, silver hairgrass and downy brome. Apply 2½ lbs of De Weed in a minimum of 15 gals of water per acre as soon as fall rains start. Apply only to grasses from which at least one seed crop has been cut.

WEED CONTROL on industrial sites, highway medians, and shoulders, railroad rights-of-way, lumber yards, and in non-crop areas on farms such as around buildings, fuel storage areas, along fences, roadsides, and lanes. Aerial application may be made where it is feasible. Use at least 1 gal of water for each 1 lb. of De Weed: use more water if practical for both ground and aerial application. To control annual broadleaf and grass weeds (including barnyard grass, cheat, crabgrass, lambsquarters, foxtail, ragweed, puncturevine and mullein), apply 6-12½ lbs. per acre. To control most annual and many perennial broadleaf and grass weeds (including quackgrass, bluegrass, redtop, burdock, Canada thistle, orchardgrass, dogfennel, and plantain), apply 12½-25 lbs. per acre. To control hard-to-kill perennial weeds (including bull thistle and sow thistle), apply 25-50 lbs. per acre.

NET WEIGHT FIVE POUNDS

FORMULATION AND APPLICATION
UNIT VIII

ANSWERS TO TEST

1. a. 3
   b. 5
   c. 2
   d. 1
   e. 4

2. a. 10
   b. 1
   c. 11
   d. 2
   e. 12
   f. 3
   g. 9
   h. 4
   i. 5
   j. 8
   k. 7
   l. 6

3. Any two of the following:
   a. Effectiveness against the pest
   b. Habits of the pest
   c. Plant, animal, or surface to be protected
   d. Possible injury to the protected surface
   e. Application equipment which is available
   f. Danger of drift or runoff

4. a. 3
   b. 12
   c. 4
   d. 11
   e. 5
   f. 10
   g. 6
   h. 9
   i. 1
   j. 8
   k. 2
   l. 7

5. Discussion should include:

Formulation	Advantages	Disadvantages	Principal Use
a. Du[illegible]	Ready to use; requires no mixing; easy to apply	Drift hazard; expensive	Spot treatment; livestock and poultry; limited foliage use
b. Emulsifiable concentrate	High concentration; relatively inexpensive; suitable for low pressure equipment	Easy to overdose; may be hazardous to applicator; phytotoxicity	Fruits and vegetables; farm animals; field crops
c. Wettable powder	Relatively inexpensive; safer than emulsifiable concentrate to use on tender foliage; easy to measure	May be hazardous to applicator; requires mechanical agitation; difficult to mix; may clog nozzles	Fruits and vegetables; farm animals; field crops

6. c

7. a. Fill tank half full with water
   b. Start agitator
   c. Measure out correct amount of wettable powder
   d. Add powder to a small amount of water in a clean mixing bucket
   e. Stir until well mixed
   f. Add slurry to tank
   g. Finish filling the tank

8. Any three of the following:
   a. Follow all safety precautions stated on the label
   b. Use protective clothing and equipment as stated on the label
   c. Rinse empty containers and measuring cups to remove any residue
   d. Make sure mixes of two or more pesticides are compatible
   e. Avoid splashes, spills, and leaks

   - f. Wash all contaminated areas on clothing or equipment
   - g. Dispose of empty containers properly

9. Description should include:
   - a. Is hazardous to the environment
   - b. May injure wildlife
   - c. Contaminates water, foliage, and pasture
   - d. May damage nearby crops and cause illegal residues
   - e. Is expensive

10. a. Read the label; never use more than the dosage rate recommended
    - b. Consult an expert for less than recommended rate

11. 2.5 lbs per 75 gallons of water

12. 30 pints or 15 quarts or 3 gallons and 3 quarts

13. a. 8.3
    - b. 16
    - c. 2
    - d. 1

14. a. Wettable powder
    - b. WP or W
    - c. Water
    - d. 80% of 5 pounds = 4 pounds
    - e. 1) 10 acres
      - 2) 5 pounds per acre
      - 3) 50 pounds

EQUIPMENT AND ITS USE
UNIT IX

TERMINAL OBJECTIVE

After completion of this unit, the student should be able to identify types of equipment used to apply pesticides, describe the procedure for calibrating the equipment, and calculate problems involving calibration. This knowledge will be evidenced through demonstration and by scoring eighty-five percent on the unit test.

SPECIFIC OBJECTIVES

After completion of this unit, the student should be able to:

1. Match terms associated with pesticide equipment and their uses to the correct definitions.
2. Identify types of pesticide application equipment.
3. List types of support equipment needed for application of pesticide.
4. Discuss in a short paragraph the importance of choosing the proper equipment when applying pesticides.
5. Complete a chart listing the advantages and disadvantages of common types of application equipment.
6. List safety precautions to observe when cleaning and storing equipment after use.
7. Match types of nozzles to the correct descriptions.
8. Tell why it is important to calibrate equipment.
9. Describe the procedure for calibrating pesticide application equipment by arithmetic calculation.
10. Calculate problems involving pesticide equipment calibration.

EQUIPMENT AND ITS USE
UNIT IX

SUGGESTED ACTIVITIES

I. Instructor:

   A. Provide student with objective sheet.

   B. Provide student with information and assignment sheets.

   C. Make transparencies.

   D. Discuss terminal and specific objectives.

   E. Discuss information and assignment sheets.

   (NOTE: Instructors may want to provide additional assignment sheets using labels common to the local community. Assignment Sheet #2 is optional and should be completed only if nomographs are used in the local community.)

   F. Give test.

II. Student:

   A. Read objective sheet.

   B. Read and study information sheet.

   C. Complete assignment sheets.

   D. Take test.

INSTRUCTIONAL MATERIALS

I. Objective sheet

II. Information sheet

III. Transparency masters

   A. TM 1--Types of Pesticide Application Equipment

   B. TM 2--Types of Pesticide Application Equipment (Continued)

   C. TM 3--Types of Pesticide Application Equipment (Continued)

   D. TM 4--Types of Support Equipment

- E. TM 5--Types of Support Equipment (Continued)
- F. TM 6--Types of Nozzles
- G. TM 7--Sprayer Calibration Nomograph

IV. Assignment sheets

- A. Assignment Sheet #1--Calculate Problems Involving Pesticide Equipment Calibration
- B. Assignment Sheet #2--Calculate Problems Using Nomograph

V. Answers to assignment sheets

VI. Test

VII. Answers to test

EQUIPMENT AND ITS USE
UNIT IX

INFORMATION SHEET

I. Terms and definitions

  A. Dilute--To make a pesticide thinner or weaker by adding water, oil, or other materials

  B. Concentrate--Pesticide as it is sold before diluting; usually contains a large amount of the active ingredient

  C. Diluent--Liquid or dust used to water down or weaken a concentrated pesticide

  D. Formulation--Mixture of one or more active ingredients with other materials needed to make it safe and easy to store, dilute, and apply

  E. Target--Pest intended to be controlled with pesticide

  F. Site--Area, building, plant, or animal to be treated with the pesticide in order to protect it from or reach a target pest

  G. Compatibility--Mixing of two or more pesticides without reducing their effectiveness

  H. Adjuvant (additive)--Substance added to the pesticide mixture to make the material work better

  Examples: Wetting agent, spreaders, adhesive, emulsifying agent, penetrant

  I. Calibration--Measurement of how much pesticide will be applied by the equipment to the site; measurement of the delivery rate

II. Types of pesticide application equipment (Transparencies 1, 2, and 3)

  A. Hand sprayer

  B. Low pressure field sprayer

  C. High pressure field sprayer

  D. Air blast sprayer or mist blower

  E. Ultra-low volume sprayer

  F. Hand duster

G. Power duster

H. Granular applicator

I. Fumigant applicator

J. Aerosol generator

K. Fogger

L. Aerosol bomb

M. Back rubber

N. Dust bag

O. Dipping vat

P. Airplane

Q. Paintbrush

III. Support equipment (Transparencies 4 and 5)

(NOTE: Support equipment is used in addition to application equipment.)

A. Filler pump

B. Tank truck

C. Nurse or mixing tank

D. Front-end loader

E. Tractor

IV. Importance of choosing proper equipment

A. Saves time

B. Saves money

C. Provides more thorough application

D. Applies pesticides correctly

INFORMATION SHEET

V. Advantages and disadvantages of application equipment

EQUIPMENT	ADVANTAGES	DISADVANTAGES
A. Aerosol (generator)	Penetrates cracks and crevices; usually reaches all pests within the area; area can be used soon after treatment by ventilating	No long term control possible; difficult to get long term control; special pesticide formulation necessary; drift
B. Duster (hand and power)	Lightweight; inexpensive; requires no water	Drift hazard; high cost of pesticide; hard to control amount of application; must calibrate for each product
C. Back rubber (rubbing post, dust bag)	Can work over a long period of time; relatively inexpensive; portable	Livestock only; cannot control amount of application; all animals may not use applicator
D. Granular applicator	Lightweight; no water needed; often used in fertilizer spreader or seeder	High cost of pesticide; limited foliar use; must calibrate for each size of granule
E. Hand sprayer	Economical; simple; easy to use and clean; can use in close situations	Not practical for large areas; lacks agitation; wettable powder may clog nozzles
F. Air-blast sprayer	Good coverage and penetration; low pressure pump; mechanical agitation	Drift hazard; chance of overdose; difficult to use in small areas; hard to confine discharge to a limited target
G. Low pressure field sprayer	Low cost; lightweight; versatile covers large areas rapidly	Low volume output limits pesticide penetration; agitation is limited
H. High pressure field sprayer	Well-built; long life; usually has mechanical agitation; very versatile	Expensive; requires large amounts of water, power, and fuel; heavy tire loads; drift hazard
I. Ultra-low volume sprayer	No water is needed; equal control with low pressure operational cost/acre	Does not provide for thorough wetting; hazard in using high concentrations; chance of overdose; small numbers of pesticides can be used

VI. Safety precautions when cleaning and storing equipment

A. Wear protective clothing and equipment as called for on the label

B. Follow ALL safety precautions stated on label

C. Check equipment for leaks

D. Use all of the pesticide mix in the sprayer

E. Wash equipment before storing

F. Release pressure

G. Wash out tank and dispose of residue properly

H. Flush nozzles with clean water

VII. Types of nozzles (Transparency 6)

A. Solid stream--Compact jet used in handguns to spray a distant target or fixed to apply a narrow band or to inject into the soil

B. Regular flat fan--Narrow oval pattern with lighter edges; used for broadcast spraying

C. Flooding flat fan--Wide angle spray pattern; used for broadcast spraying

D. Even flat fan--Uniform pattern across its width; used for band spraying

E. Hollow cone--Circular pattern with little or no spray in the center; used for spraying foliage

F. Solid (full) cone--Circular pattern; used for spraying foliage

G. Broadcast--Wide flat fan pattern; used for boomless sprayers or to extend the effective width on the end of the boom

VIII. Importance of calibrating equipment

A. Obtain desired control

B. Practice good economics

C. Apply proper dosage of the pesticide

(NOTE: Avoid overdosing.)

INFORMATION SHEET

IX. Procedure for calibrating equipment

(NOTE: One can calibrate several ways, with or without arithmetic or by using a nomograph. A nomograph is a carefully plotted chart used to determine the missing factor.)

A. Arithmetic calibration

1. Determine pumping rate

   a. Fill spray tank completely full of water

   b. Put vehicle in neutral at the throttle setting (rpm) desired

   c. Open the spray valve and pump for a predetermined time

   d. Close valve, shut down the equipment, and measure the amount of water needed to refill the tank

   e. Divide the number of gallons by time to get pumping rate

   Example: $\frac{\text{10 gallons needed to refill tank}}{\text{5 minutes}} =$

   2 gal/min pumping rate

2. Determine gallons per acre

   a. Determine the number of feet the sprayer moves at the desired speed and throttle

   b. Measure the width of the sprayer boom

   c. Determine the pumping rate

   d. Figure the area that the sprayer covered in one minute (distance traveled x boom width)

   (NOTE: One mile per hour equals 88 feet per minute.)

   Example: 440 feet traveled in one minute x 20 feet boom width = 8800 square feet covered per minute

   e. Figure how many minutes it would take to spray one acre (divide 43,560 by the area covered in one minute)

   (NOTE: One acre equals 43,560 square feet.)

   Example: 43,560 square feet ÷ 8800 square feet = 4.95 minutes or 5 minutes per acre

f. Figure the amount of spray pumped per acre (pumping rate x number of minutes per acre)

Example: 2 gallons per minute x 5 minutes per acre = 10 gallons per acre

B. Other methods

1. Measurement method

a. Measure off an acre (100 feet x 436 feet)

b. Fill tank with water

c. Spray the acre

d. Refill tank to determine amount used

Example: 10 gallons to refill; application rate is 10 gallons per acre

(NOTE: This tells you how much of the mixture you would apply.)

e. Read label to determine mixing rate

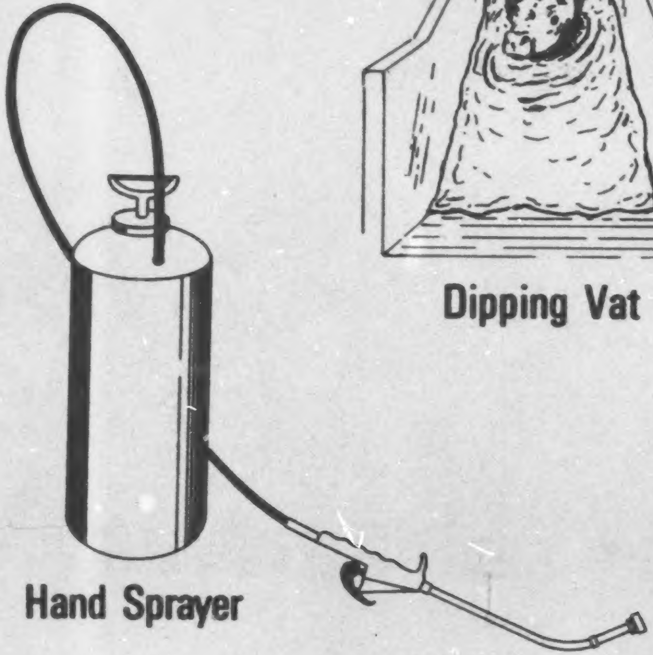
2. Use of nomograph (Transparency 7)

(NOTE: This method is not used in all areas of the country.)

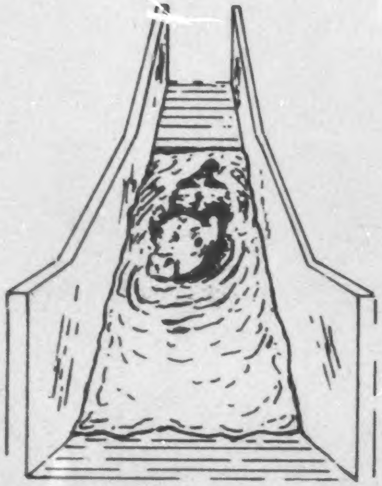
Example: Sprayer ground speed is 4 mph, nozzle spacing is 20 inches, and desired application rate is 20 gal/acre

Solution: Using a straightedge, draw a line from 4 mph on the "speed line" through 20 inches on "nozzle spacing line" and locate point where line intercepts "pivot line". Now draw a line through intercept point on "pivot line" and through 20 gal/acre on "application rate line" and locate point where line intercepts "calibration check line". Read either 35 oz/min or 0.27 gal/min. Select nozzle size to give 0.27 gal/min at desired pressure. Adjust pressure regulator to give a flow rate of 35 oz/min from each nozzle

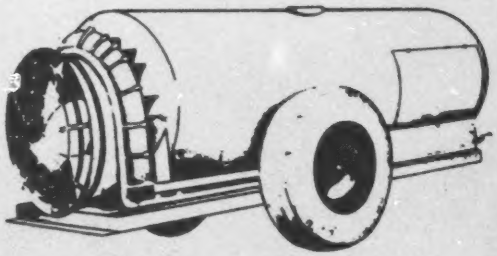
Types of Pesticide Application Equipment



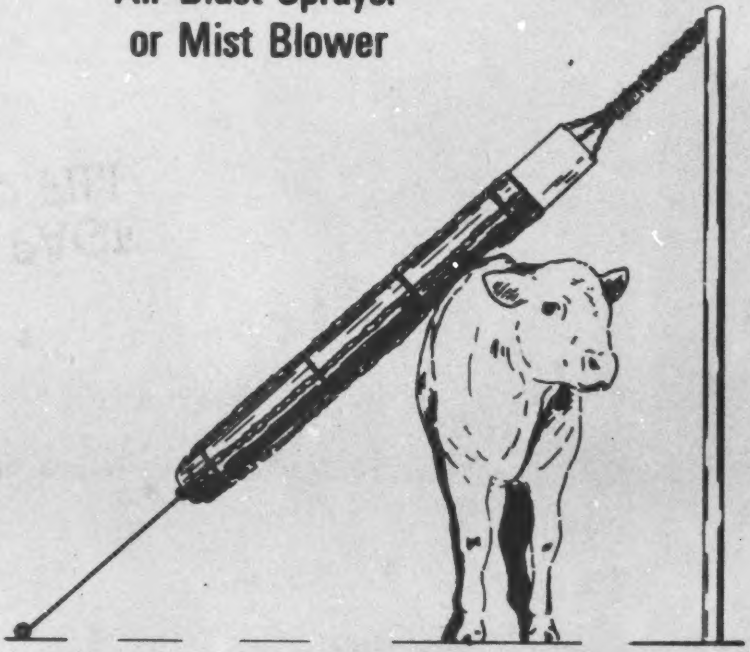
Hand Sprayer



Dipping Vat



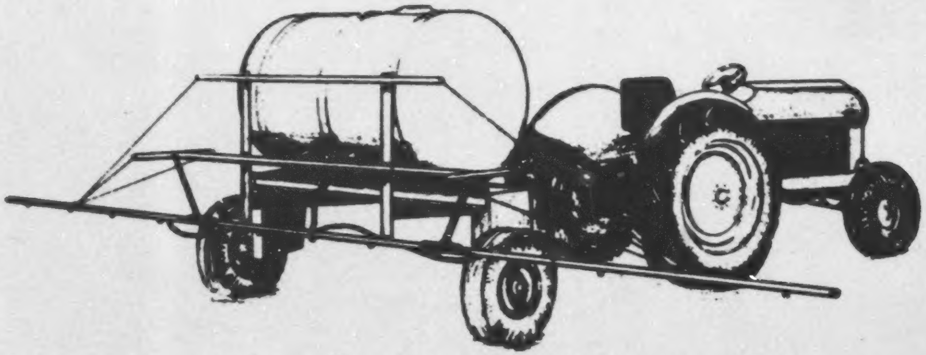
Air Blast Sprayer
or Mist Blower



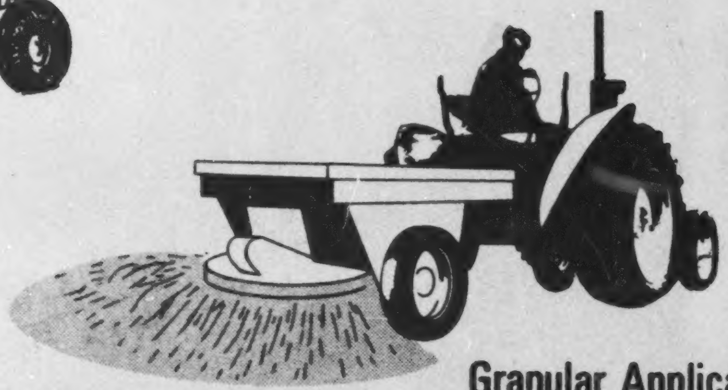
Back Rubber

Types of Pesticide Application Equipment

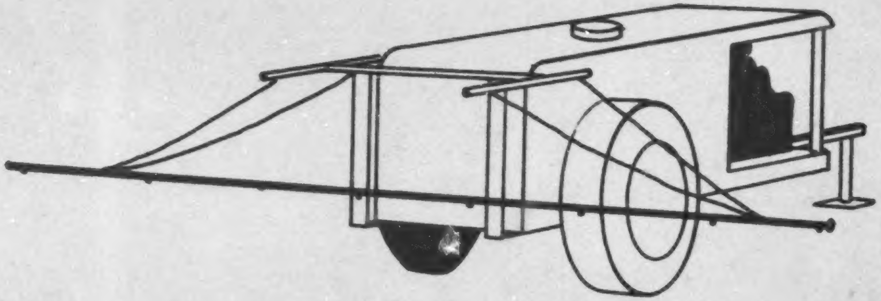
(Continued)



Low Pressure Field Sprayer



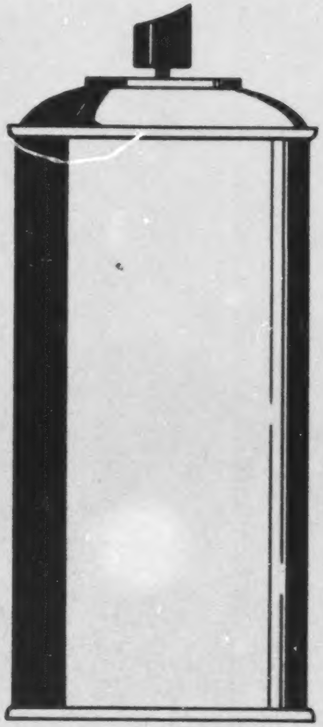
Granular Applicator



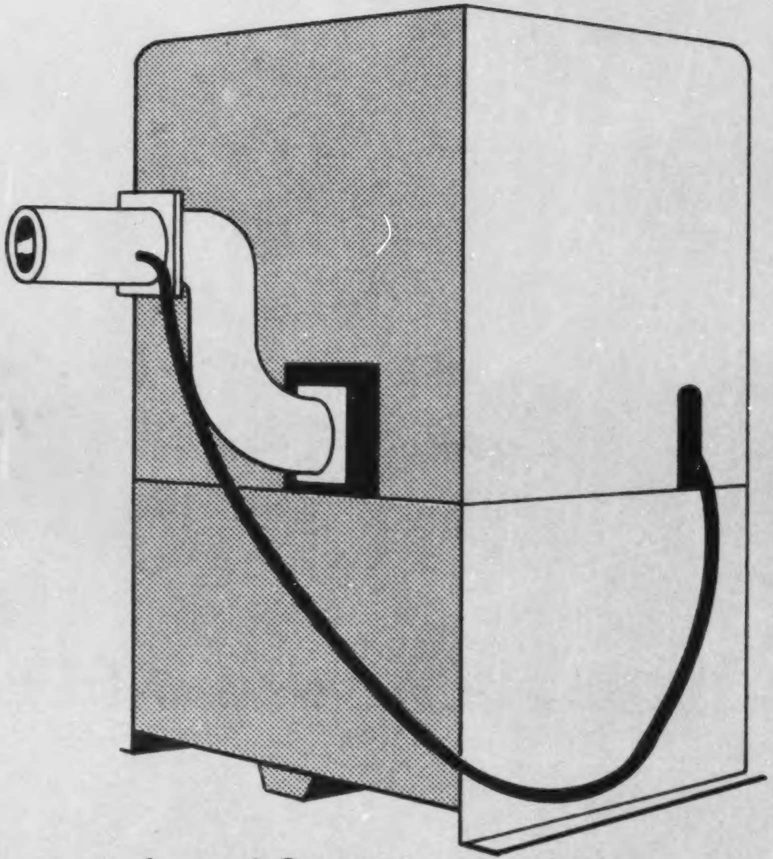
High Pressure Field Sprayer

Types of Pesticide Application Equipment

(Continued)

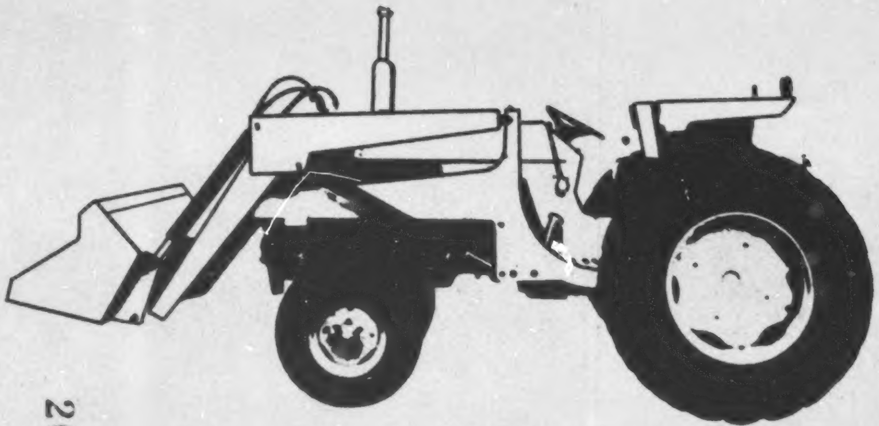


Aerosol Bomb

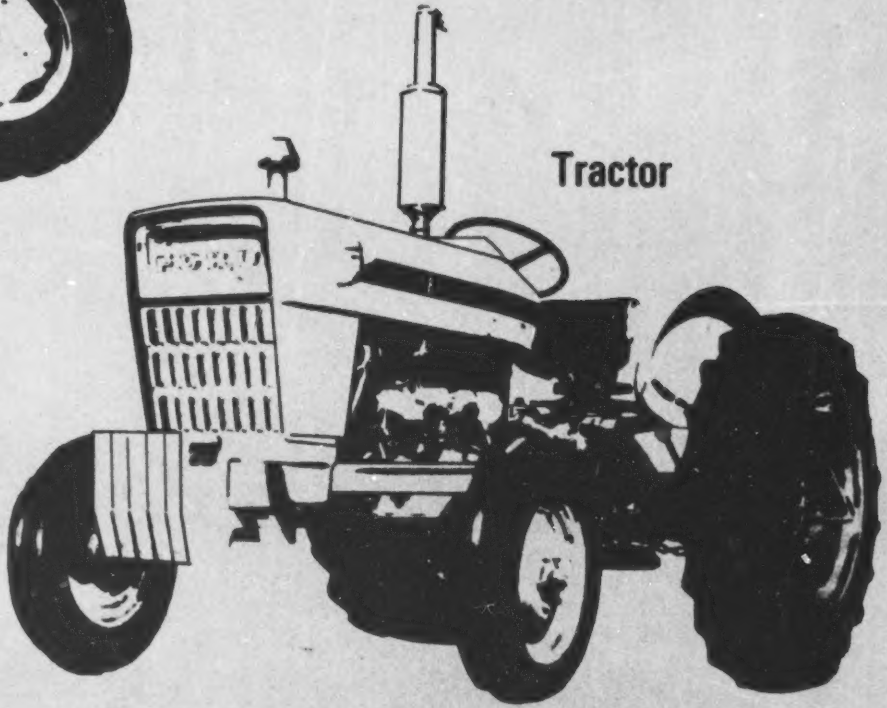


Aerosol Generator

Types of Support Equipment



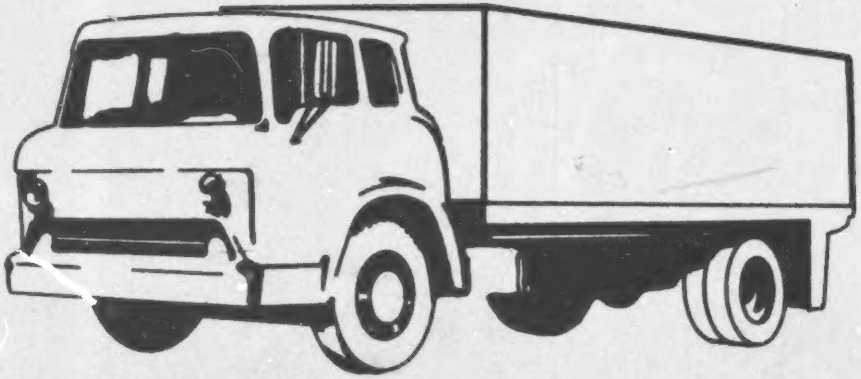
Front-End Loader



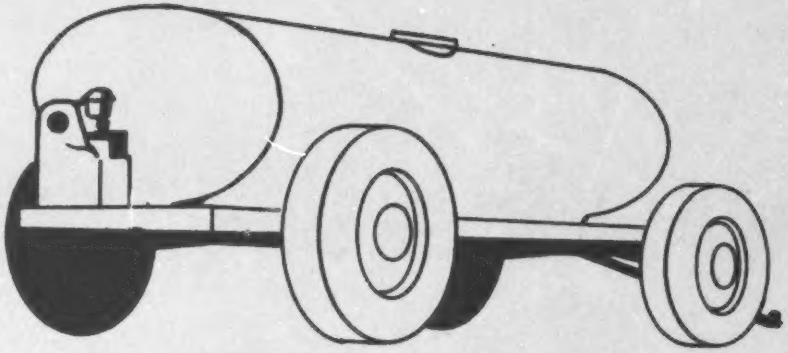
Tractor

Types of Support Equipment

(Continued)



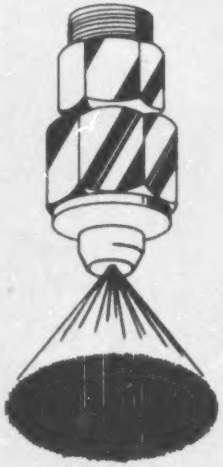
Tank Truck



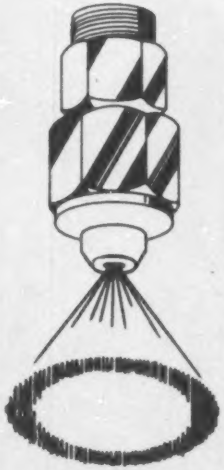
Nurse or Mixing Tank

Types of Nozzles

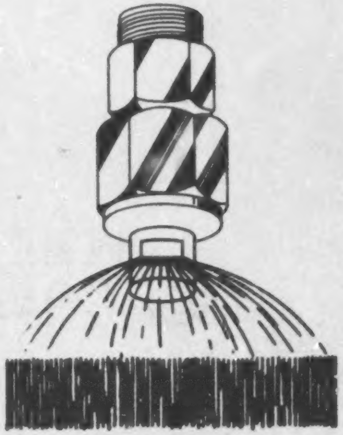
Solid (Full)
Cone Nozzle



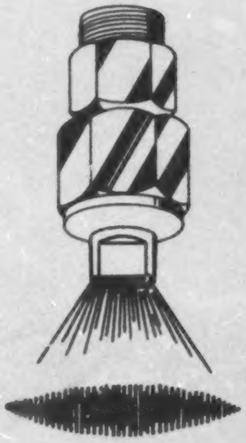
Hollow
Cone Nozzle

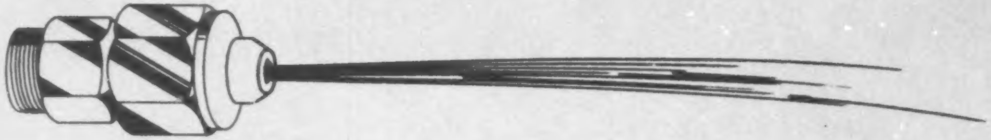


Flooding Flat
Fan Nozzle



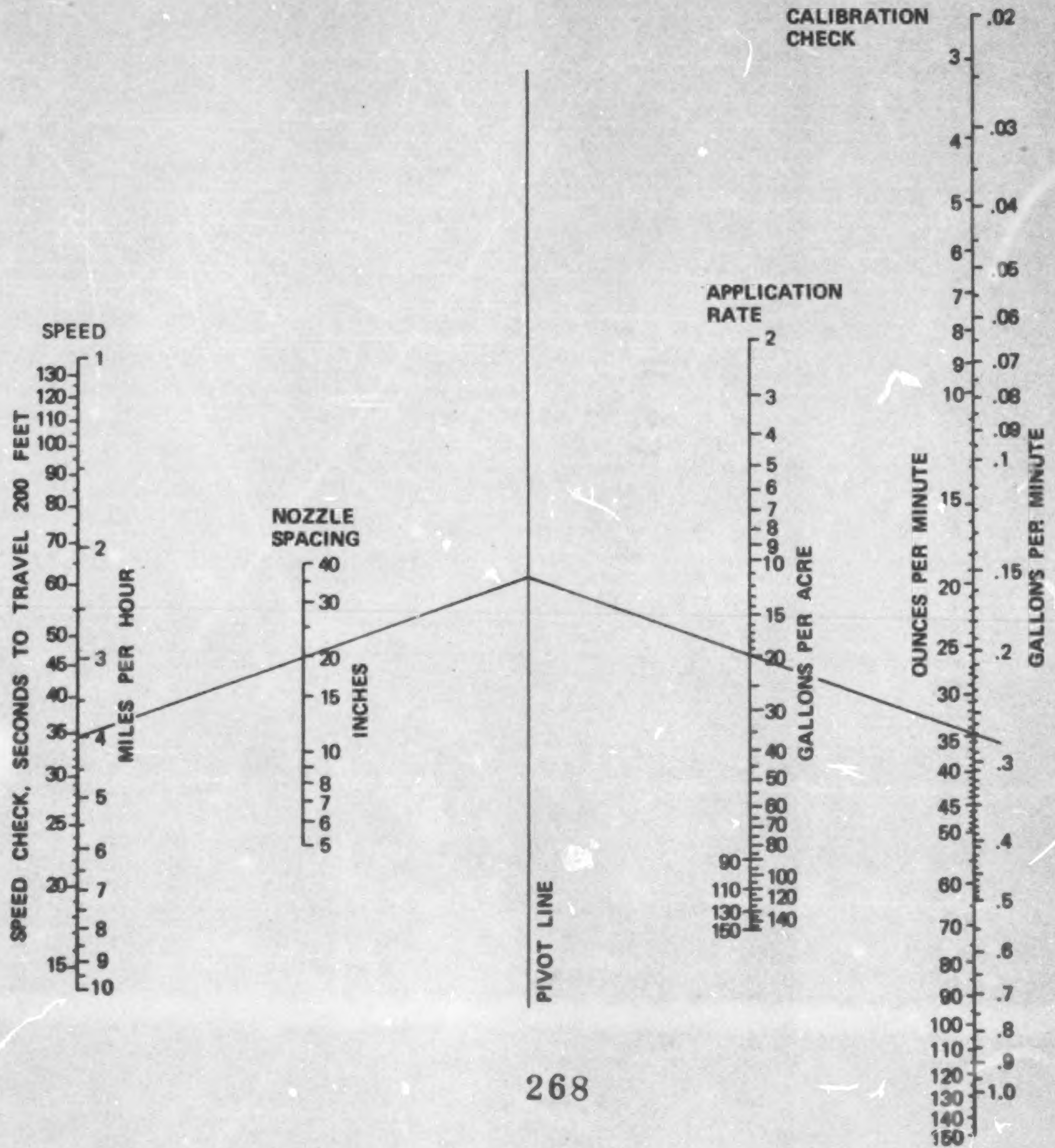
Regular Flat
Fan Nozzle





Solid Stream Nozzle

Sprayer Calibration Nomograph



EQUIPMENT AND ITS USE
UNIT IX

ASSIGNMENT SHEET #1--CALCULATE PROBLEMS INVOLVING PESTICIDE EQUIPMENT CALIBRATION

Read the labels provided on the following pages. Determine the amount of pesticide to use and the type of equipment to use to make an application by answering the questions below.

1. Equipment

   a. What equipment would you use to apply De Metho?

   b. What equipment would you use to apply No-Disease?

   c. What equipment would you use to apply Anti-Weed?

2. Amounts of pesticide to use

   (NOTE: Show your work.)

   a. Your sprayer pumps 15 gallons in 5 minutes. What is the pumping rate? (gallons ÷ time)

   b. You have determined that at the speed and throttle setting you intend to use, your sprayer moves at 528 feet per minute. (6 mph = 528 feet per minute or 1 mph = 88 feet per minute). The sprayer boom covers a space of 15 feet wide. How many square feet does your sprayer cover in one minute? (width of sprayer x feet per minute)

c. One acre = 43,560 square feet. How many minutes would it take to spray one acre? (Square feet in one acre÷number of square feet covered in one minute)

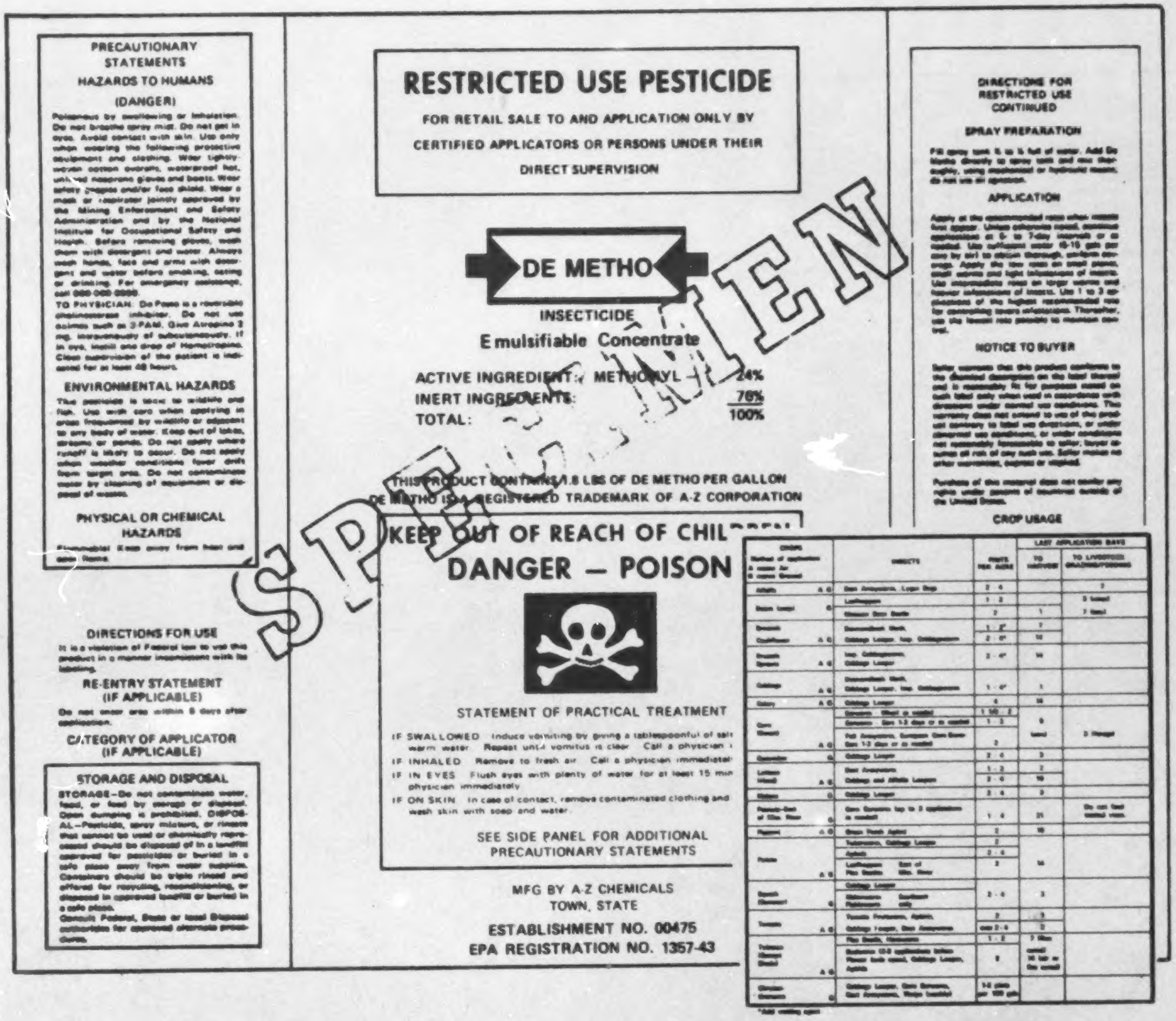
d. How much spray does your sprayer pump per acre? (pumping rate x time to cover one acre)

e. Using the following facts, determine the pumping rate, speed sprayer travels per minute, time to cover one acre, and amount of spray pumped per acre.

FACTS:
10 gallons of spray in five minutes
Spray boom width = 25 feet
Sprayer moves at 5 miles per hour
One mph = 88 feet per minute
One acre = 43,560 square feet

ANSWER:
1) Pumping rate ______________________
2) Speed sprayer travels per minute ______________________
3) Time to cover one acre ______________________
4) Amount of spray pumped per acre ______________________

ASSIGNMENT SHEET #1



PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS

(DANGER)

ENVIRONMENTAL HAZARDS

PHYSICAL OR CHEMICAL HAZARDS

DIRECTIONS FOR USE

RE-ENTRY STATEMENT (IF APPLICABLE)

CATEGORY OF APPLICATOR (IF APPLICABLE)

STORAGE AND DISPOSAL

RESTRICTED USE PESTICIDE

FOR RETAIL SALE TO AND APPLICATION ONLY BY CERTIFIED APPLICATORS OR PERSONS UNDER THEIR DIRECT SUPERVISION

DE METHO

INSECTICIDE

Emulsifiable Concentrate

ACTIVE INGREDIENT: METHOMYL	24%
INERT INGREDIENTS:	76%
TOTAL:	100%

THIS PRODUCT CONTAINS 1.8 LBS OF DE METHO PER GALLON
DE METHO IS A REGISTERED TRADEMARK OF A-Z CORPORATION

KEEP OUT OF REACH OF CHIL

DANGER — POISON

STATEMENT OF PRACTICAL TREATMENT

IF SWALLOWED Induce vomiting by giving a tablespoonful of salt warm water. Repeat until vomitus is clear. Call a physician

IF INHALED Remove to fresh air. Call a physician immediatel

IF IN EYES Flush eyes with plenty of water for at least 15 min physician immediately.

IF ON SKIN In case of contact, remove contaminated clothing and wash skin with soap and water.

SEE SIDE PANEL FOR ADDITIONAL PRECAUTIONARY STATEMENTS

MFG BY A-Z CHEMICALS
TOWN, STATE

ESTABLISHMENT NO. 00475
EPA REGISTRATION NO. 1357-43

DIRECTIONS FOR RESTRICTED USE CONTINUED

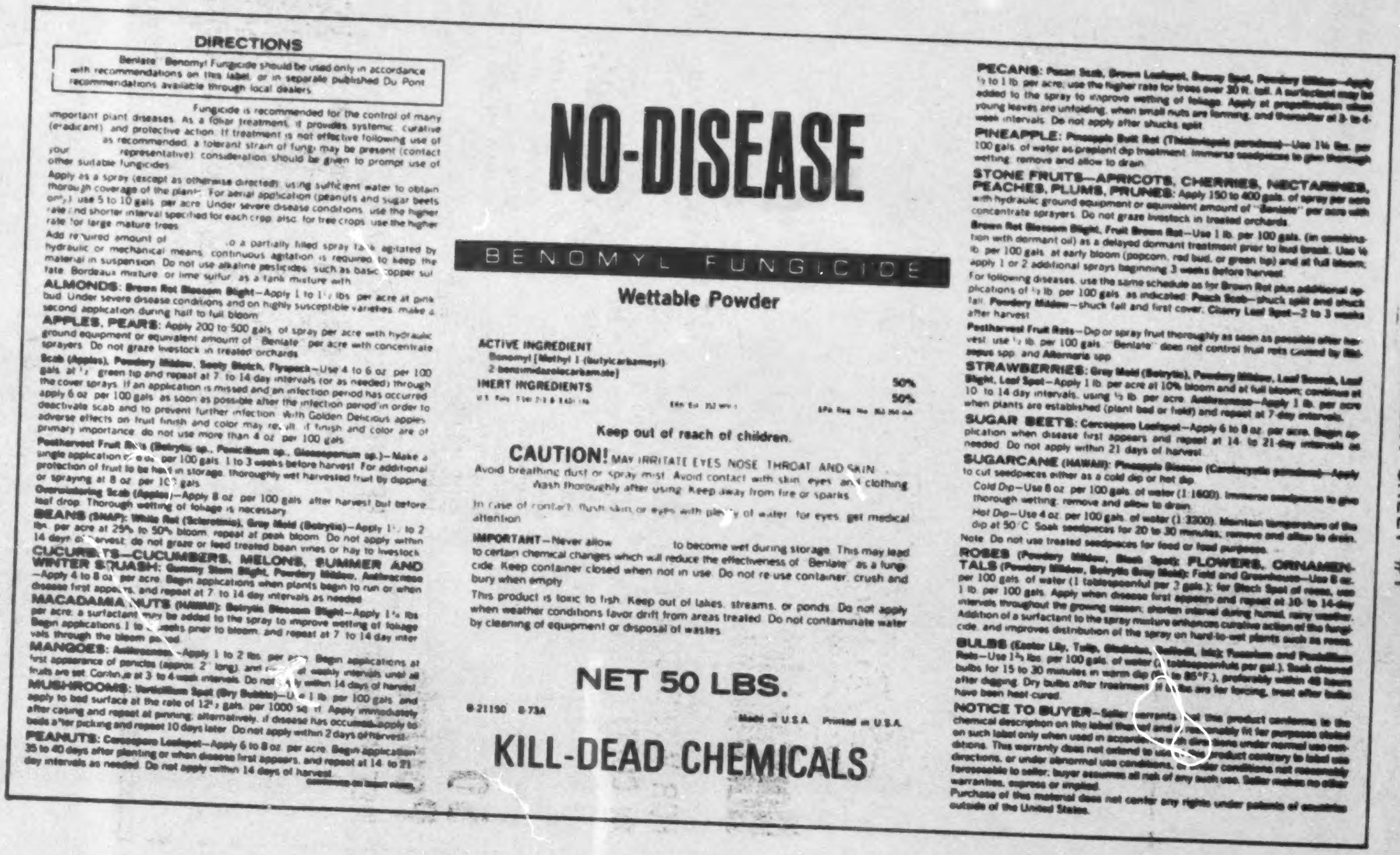
SPRAY PREPARATION

APPLICATION

NOTICE TO BUYER

CROP USAGE

ASSIGNMENT SHEET #1



DIRECTIONS

Benlate Benomyl Fungicide should be used only in accordance with recommendations on this label, or in separate published Du Pont recommendations available through local dealers.

Fungicide is recommended for the control of many important plant diseases. As a foliar treatment, it provides systemic curative (eradicant) and protective action. If treatment is not effective following use of as recommended, a tolerant strain of fungi may be present (contact your representative); consideration should be given to prompt use of other suitable fungicides.

Apply as a spray (except as otherwise directed) using sufficient water to obtain thorough coverage of the plants. For aerial application (peanuts and sugar beets only) use 5 to 10 gals. per acre. Under severe disease conditions, use the higher rate and shorter interval specified for each crop; also, for tree crops, use the higher rate for large mature trees.

Add required amount of to a partially filled spray tank agitated by hydraulic or mechanical means; continuous agitation is required to keep the material in suspension. Do not use alkaline pesticides, such as basic copper sulfate, Bordeaux mixture, or lime sulfur, as a tank mixture with

ALMONDS: Brown Rot Blossom Blight—Apply 1 to 1½ lbs. per acre at pink bud. Under severe disease conditions and on highly susceptible varieties, make a second application during half to full bloom.

APPLES, PEARS: Apply 200 to 500 gals. of spray per acre with hydraulic ground equipment or equivalent amount of "Benlate" per acre with concentrate sprayers. Do not graze livestock in treated orchards.

Scab (Apples), Powdery Mildew, Sooty Blotch, Flyspeck—Use 4 to 6 oz. per 100 gals. at ½" green tip and repeat at 7- to 14-day intervals (or as needed) through the cover sprays. If an application is missed and an infection period has occurred, apply 6 oz. per 100 gals. as soon as possible after the infection period in order to deactivate scab and to prevent further infection. With Golden Delicious apples, adverse effects on fruit finish and color may result; if finish and color are of primary importance, do not use more than 4 oz. per 100 gals.

Postharvest Fruit Rots (Botrytis sp., Penicillium sp., Gloeosporium sp.)—Make a single application of 8 oz. per 100 gals. 1 to 3 weeks before harvest. For additional protection of fruit to be held in storage, thoroughly wet harvested fruit by dipping or spraying at 8 oz. per 100 gals.

Overwintering Scab (Apples)—Apply 8 oz. per 100 gals. after harvest but before leaf drop. Thorough wetting of foliage is necessary.

BEANS (SNAP): White Mold (Sclerotinia), Gray Mold (Botrytis)—Apply 1½ to 2 lbs. per acre at 25% to 50% bloom; repeat at peak bloom. Do not apply within 14 days of harvest; do not graze or feed treated bean vines or hay to livestock.

CUCURBITS—CUCUMBERS, MELONS, SUMMER AND WINTER SQUASH: Gummy Stem Blight, Powdery Mildew, Anthracnose—Apply 4 to 8 oz. per acre. Begin applications when plants begin to run or when disease first appears, and repeat at 7- to 14-day intervals as needed.

MACADAMIA NUTS (HAWAII): Botrytis Blossom Blight—Apply 1½ lbs. per acre; a surfactant may be added to the spray to improve wetting of foliage. Begin applications 1 to 2 weeks prior to bloom, and repeat at 7- to 14-day intervals through the bloom period.

MANGOES: Anthracnose—Apply 1 to 2 lbs. per acre. Begin applications at first appearance of panicles (approx. 2" long), and repeat at weekly intervals until all fruits are set. Continue at 3- to 4-week intervals. Do not apply within 14 days of harvest.

MUSHROOMS: Verticillium Spot (Dry Bubble)—Use 1 lb. per 100 gals. and apply to bed surface at the rate of 12½ gals. per 1000 sq. ft. Apply immediately after casing and repeat at pinning; alternatively, if disease has occurred, apply to beds after picking and repeat 10 days later. Do not apply within 2 days of harvest.

PEANUTS: Cercospora Leafspot—Apply 6 to 8 oz. per acre. Begin application 35 to 40 days after planting or when disease first appears, and repeat at 14- to 21-day intervals as needed. Do not apply within 14 days of harvest.

[illegible]

NO-DISEASE

BENOMYL FUNGICIDE

Wettable Powder

ACTIVE INGREDIENT Benomyl [Methyl 1-(butylcarbamoyl)-2-benzimidazolecarbamate]	50%
INERT INGREDIENTS	50%

U.S. Pat. [illegible] [illegible] EPA Reg. No. [illegible]

Keep out of reach of children.

CAUTION! MAY IRRITATE EYES, NOSE, THROAT AND SKIN. Avoid breathing dust or spray mist. Avoid contact with skin, eyes, and clothing. Wash thoroughly after using. Keep away from fire or sparks.

In case of contact, flush skin or eyes with plenty of water; for eyes, get medical attention.

IMPORTANT—Never allow to become wet during storage. This may lead to certain chemical changes which will reduce the effectiveness of "Benlate" as a fungicide. Keep container closed when not in use. Do not re-use container; crush and bury when empty.

This product is toxic to fish. Keep out of lakes, streams, or ponds. Do not apply when weather conditions favor drift from areas treated. Do not contaminate water by cleaning of equipment or disposal of wastes.

NET 50 LBS.

®21190 8-73A

Made in U.S.A. Printed in U.S.A.

KILL-DEAD CHEMICALS

PECANS: Pecan Scab, Brown Leafspot, Downy Spot, Powdery Mildew—Apply ½ to 1 lb. per acre; use the higher rate for trees over 30 ft. tall. A surfactant may be added to the spray to improve wetting of foliage. Apply at prepollination when young leaves are unfolding, when small nuts are forming, and thereafter at 3- to 4-week intervals. Do not apply after shucks split.

PINEAPPLE: Pineapple Butt Rot (Thielaviopsis paradoxa)—Use 1½ lbs. per 100 gals. of water as preplant dip treatment. Immerse seedpieces to give thorough wetting; remove and allow to drain.

STONE FRUITS—APRICOTS, CHERRIES, NECTARINES, PEACHES, PLUMS, PRUNES: Apply 150 to 400 gals. of spray per acre with hydraulic ground equipment or equivalent amount of "Benlate" per acre with concentrate sprayers. Do not graze livestock in treated orchards.

Brown Rot Blossom Blight, Fruit Brown Rot—Use 1 lb. per 100 gals. (in combination with dormant oil) as a delayed dormant treatment prior to bud break. Use ½ lb. per 100 gals. at early bloom (popcorn, red bud, or green tip) and at full bloom; apply 1 or 2 additional sprays beginning 3 weeks before harvest.

For following diseases, use the same schedule as for Brown Rot plus additional applications of ½ lb. per 100 gals. as indicated: **Peach Scab**—shuck split and shuck fall. **Powdery Mildew**—shuck fall and first cover. **Cherry Leaf Spot**—2 to 3 weeks after harvest.

Postharvest Fruit Rots—Dip or spray fruit thoroughly as soon as possible after harvest; use ½ lb. per 100 gals. "Benlate" does not control fruit rots caused by Rhizopus spp. and Alternaria spp.

STRAWBERRIES: Gray Mold (Botrytis), Powdery Mildew, Leaf Scorch, Leaf Blight, Leaf Spot—Apply 1 lb. per acre at 10% bloom and at full bloom; continue at 10- to 14-day intervals, using ½ lb. per acre. **Anthracnose**—Apply 1 lb. per acre when plants are established (plant bed or field) and repeat at 7-day intervals.

SUGAR BEETS: Cercospora Leafspot—Apply 6 to 8 oz. per acre. Begin application when disease first appears and repeat at 14- to 21-day intervals as needed. Do not apply within 21 days of harvest.

SUGARCANE (HAWAII): Pineapple Disease (Ceratocystis paradoxa)—Apply to cut seedpieces either as a cold dip or hot dip.

Cold Dip—Use 8 oz. per 100 gals. of water (1:1600). Immerse seedpieces to give thorough wetting; remove and allow to drain.

Hot Dip—Use 4 oz. per 100 gals. of water (1:3200). Maintain temperature of the dip at 50°C. Soak seedpieces for 20 to 30 minutes; remove and allow to drain.

Note: Do not use treated seedpieces for food or feed purposes.

ROSES (Powdery Mildew, Black Spot); FLOWERS, ORNAMENTALS (Powdery Mildew, Botrytis Gray Mold): Field and Greenhouse—Use 8 oz. per 100 gals. of water (1 tablespoonful per 2 gals.); for Black Spot of roses, use 1 lb. per 100 gals. Apply when disease first appears and repeat at 10- to 14-day intervals throughout the growing season; shorten interval during humid, rainy weather. Addition of a surfactant to the spray mixture enhances curative action of the fungicide, and improves distribution of the spray on hard-to-wet plants such as roses.

BULBS (Easter Lily, Tulip, Gladiolus, Daffodil, Iris): Fusarium and Penicillium Rots—Use 1⅔ lbs. per 100 gals. of water (2 tablespoonfuls per gal.). Soak cleaned bulbs for 15 to 30 minutes in warm dip (80° to 85°F.), preferably within 48 hours after digging. Dry bulbs after treatment. If bulbs are for forcing, treat after bulbs have been heat-cured.

NOTICE TO BUYER—Seller warrants that the product conforms to the chemical description on the label thereof and is reasonably fit for purposes stated on such label only when used in accordance with directions under normal use conditions. This warranty does not extend to use of the product contrary to label use directions, or under abnormal use conditions, or under conditions not reasonably foreseeable to seller; buyer assumes all risk of any such use. Seller makes no other warranties, express or implied.

Purchase of this material does not confer any rights under patents of countries outside of the United States.

ASSIGNMENT SHEET #1

Anti-Weed

20G

SAMPLE LABEL

Herbicide

FOR WEED CONTROL
IN CORN

Active Ingredients: 20.0%
Atrazine: 2-chloro-4-Ethylamino-6-isopropylamino-s-triazine . . . 6.32%
Related compounds . . .34%
2-chloro-N-isopropylacetanilide . . 13.34%
Inert Ingredients: 80.0%
Total: 100.0%

Anti-Weed 20G is a granular herbicide

Warning:

Keep out of reach of children. See additional warning statements on back of bag.

50
Pounds
NET WEIGHT

EPA Reg. No. 1000-519

KILL-DEAD
Chemical Company

ASSIGNMENT SHEET #1

DIRECTIONS FOR USE AND CONDITIONS OF SALE AND WARRANTY

IMPORTANT: Read the entire **Directions For Use** and the **Conditions Of Sale And Warranty** before using this product.

Conditions Of Sale And Warranty

The **Directions For Use** of this product reflect the opinion of experts based on field use and tests. The directions are believed to be reliable and should be followed carefully. However, it is impossible to eliminate all risks inherently associated with use of this product. Crop injury, ineffectiveness or other unintended consequences may result because of such factors as weather conditions, presence of other materials or the manner of use or application all of which are beyond the control of or the Seller. All such risks shall be assumed by the Buyer.

warrants that this product conforms to the chemical description on the label and is reasonably fit for the purposes referred to in the **Directions For Use,** subject to the inherent risks referred to above. **makes no other express or implied warranty of Fitness or Merchantability or any other express or implied warranty.** In no case shall or the Seller be liable for consequential, special or indirect damages resulting from the use or handling of this product. and the Seller offer this product and the Buyer and user accept it, subject to the foregoing **Conditions Of Sale And Warranty** which may be varied only by agreement in writing signed by a duly authorized representative of

General Information

Anti-Weed will control most annual broadleaf and grass weeds in field corn, silage corn and sweet corn. It should be applied prior to weed and crop emergence.

Since Anti-Weed acts mainly through root absorption, its effectiveness depends on rainfall or irrigation to move it into the root zone. Best results are obtained when moisture occurs within 10 days after application. Should moisture not occur within this period or should weeds develop, a shallow cultivation or rotary hoeing will generally result in better weed control.

Anti-Weed is noncorrosive to equipment and metal surfaces, nonflammable and has low electrical conductivity.

Care should be taken to avoid using Anti-Weed where adjacent desirable trees, shrubs or plants might be injured.

Store Anti-Weed in a dry place.

Application Instructions

Broadcast or Overall Treatment

Use broadcast applicators or fertilizer spreaders that can apply small amounts of granules evenly.

Band Treatment

Use applicators designed for this purpose. Calculate the amount of granules per acre needed for band treatment as follows:

$$\frac{\text{Band Width in Inches}}{\text{Inches Between Crop Rows}} \times \begin{array}{c}\text{Recommended}\\ \text{Broadcast Rate}\end{array} = \begin{array}{c}\text{lbs./Acre}\\ \text{Anti-Weed}\\ \text{for Band}\\ \text{Treatment}\end{array}$$

Range of Rates: In each case where a range of rates is given, the lower rate should be used on soils low in organic matter and the higher rate should be used on soils high in organic matter.

Directions for Use

Anti-Weed controls most annual broadleaf and grass weeds such as:

Giant Foxtail
Green Foxtail
Yellow Foxtail
Barnyardgrass
(Watergrass)
Crabgrass

Fall Panicum
Annual Morningglory
Cocklebur
Sandbur
Jimsonweed
Lambsquarters

Mustard
Pigweed
Ragweed
Smartweed
Sunflower
Velvetleaf

Anti-Weed will not control perennial weeds such as:

Johnsongrass   Field Bindweed   Canada Thistle   Bull Nettle

Apply Anti-Weed at planting behind the press wheel or immediately after planting prior to emergence of either crop or weeds. See table below for recommended rates.

Soil	Rate per acre of Anti-Weed Broadcast
Light soils: Sands, loamy sands, and sandy loams	15 lbs.
Medium to heavy soils including the dark prairie soils in the Corn Belt**	22.5– 30 lbs.

*For calculation of band treatment rate, see Application Instructions Section.

** Anti-Weed should not be used on high organic soils such as peat and muck.

Suggestions for Crop Rotations

1) Corn may be replanted at any time following application of Anti-Weed . 2) Sorghum may be seeded in all areas the spring following application of the granules. 3) Soybeans may be seeded in Louisiana, Arkansas, Missouri, Iowa and Southeastern Minnesota and areas east of these states the spring following applications made not later than June 1 of the previous year.

Precautions: 1) Do not plant sugar beets, tobacco, vegetables (including dry beans), spring-seeded small grains or small-seeded legumes and grasses the year following Anti-Weed application or injury may occur. 2) Following harvest of a treated crop, plow (moldboard or disk-plow) and thoroughly till the soil in the fall or spring to minimize possible injury to rotational spring-seeded crops. 3) Injury to rotational crops following application may occur on eroded hillsides, alkali outcroppings, gravelly areas and on soils in general with pH near or exceeding 7.5. 4) Do not graze treated area or feed treated forage to livestock for 21 days following application.

Warning

Keep out of reach of children.

Irritating to skin, eyes, nose and throat. May be harmful if swallowed. May cause allergic skin reaction. Do not get in eyes, on skin or on clothing. Avoid breathing dust. Do not take internally. While handling, wear rubber gloves. In case of contact, flush skin or eyes with plenty of water; for eyes, get medical attention. Launder clothing before reuse. Avoid contamination of seed, feed and foodstuffs.

This product is toxic to fish. Keep out of lakes, ponds and streams.

Do not reuse container. Destroy when empty.

EQUIPMENT AND ITS USE
UNIT IX

ASSIGNMENT SHEET #2--CALCULATE PROBLEMS USING NOMOGRAPH

Use the nomograph provided on the following page to calculate the problems below:

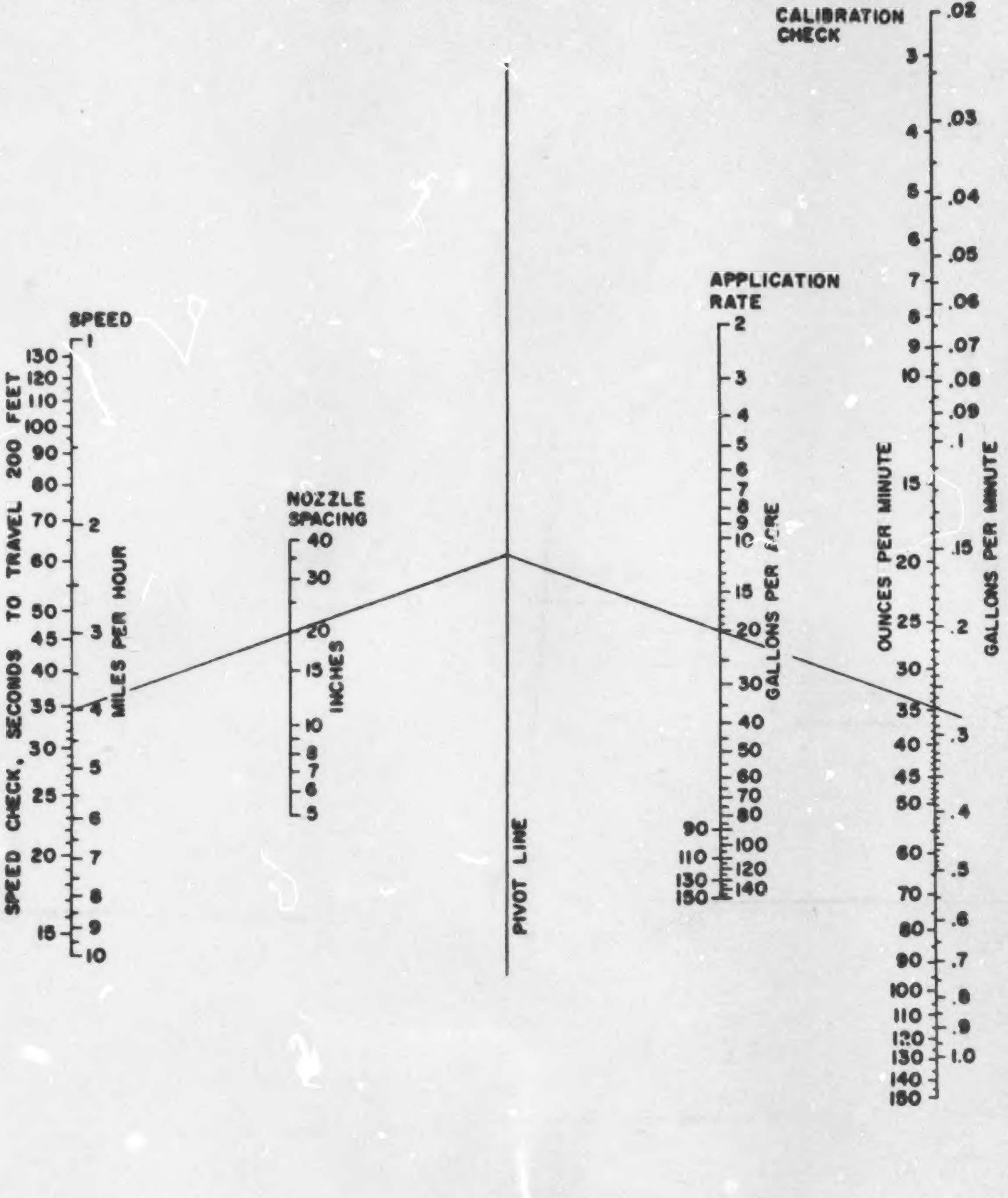
1. A broadcast sprayer has a 20 inch nozzle spacing. A check of the nozzles shows each one puts out 28 ounces per minute. How fast would you have to drive to apply 15 gallons per acre?

2. Rows are 40 inches apart. You want to spray a 14 inch band at 5 miles per hour and with an equivalent broadcast rate of 25 gallons per acre. How many ounces per minute would be applied?

3. You want to spray a broadcast rate of 25 gallons per acre at a speed of 3.5 miles per hour. The nozzles are spaced 20 inches apart on the boom. What should be the flow rate for each nozzle?

ASSIGNMENT SHEET #2

SPRAYER CALIBRATION NOMOGRAPH



EQUIPMENT AND ITS USE
UNIT IX

ANSWERS TO ASSIGNMENT SHEETS

Assignment Sheet #1

1. Equipment
   a. Probably a low pressure field sprayer; a high pressure field sprayer might be used
   b. Probably a low pressure field sprayer; a high pressure field sprayer might be used
   c. Granular spreader
2. Amounts of pesticide to use
   a. 3 gal/min
   b. 7920 sq ft
   c. 5.5 min/acre
   d. 16.5 gal/acre
   e. 1) 2 gal/min
      2) 440 ft/min
      3) 3.96 or 4 min/acre
      4) 8 gal/acre

Assignment Sheet #2

1. 4.3 miles per hour
2. 38 ounces per minute per nozzle
3. 0.3 gallons per minute or 38.5 ounces per minute

EQUIPMENT AND ITS USE
UNIT IX

TEST

1. Match the terms on the right to the correct definition.

_____a. Mixture of one or more active ingredients with other materials needed to make it safe and easy to store, dilute, and apply

_____b. To make a pesticide thinner or weaker by adding water, oil, or other materials

_____c. Measurement of how much pesticide will be applied by the equipment to the site; measurement of the delivery rate

_____d. Pest intended to be controlled with pesticide

_____e. Pesticide as it is sold before diluting; usually contains a large amount of the active ingredient

_____f. Mixing of two or more pesticides without reducing their effectiveness

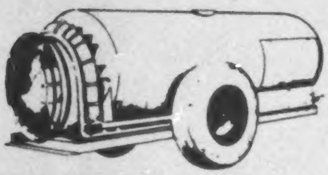
_____g. Liquid or dust used to water down or weaken a concentrated pesticide

_____h. Substance added to the pesticide mixture to make the material work better

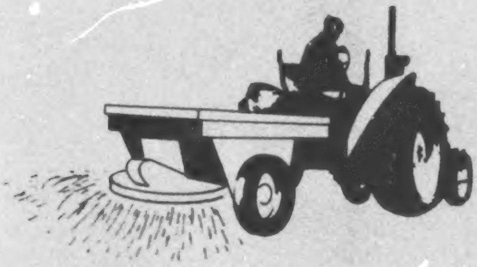
_____i. Area, building, plant, or animal to be treated with the pesticide in order to protect it from or reach a target pest

1. Dilute
2. Concentrate
3. Diluent
4. Formulation
5. Target
6. Site
7. Compatibility
8. Adjuvant (additive)
9. Calibration

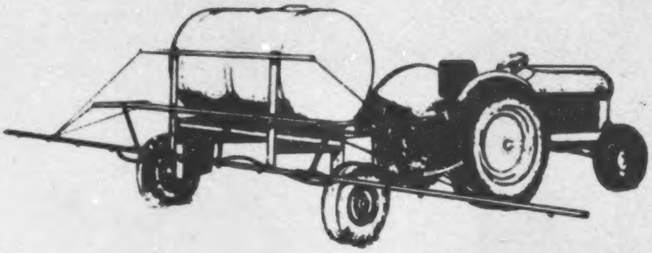
2. Identify the following types of pesticide application equipment by writing the correct name in the blank.



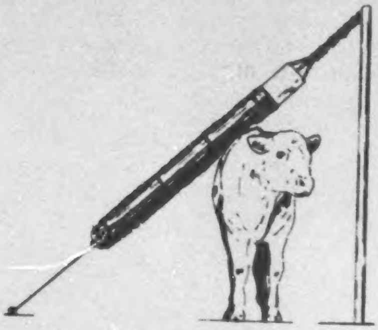
a.



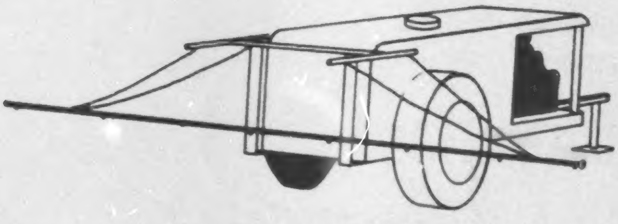
b.



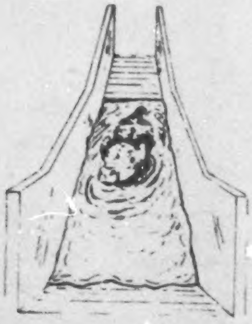
c.



d.



e.



f.

3. List three types of support equipment needed for application of pesticide.

a.

b.

c.

4. Discuss in a short paragraph the importance of choosing the proper equipment when applying pesticides.

5. Complete the following chart.

Equipment	Advantages	Disadvantages
High pressure field sprayer		
Low pressure field sprayer		
Granular applicator		

6. List five safety precautions to observe when cleaning and storing equipment after use.

a.

b.

c.

d.

e.

7. Match the types of nozzles on the right to the correct description.

_____a. Circular pattern; used for spraying foliage

_____b. Wide flat fan pattern; used for boomless sprayers or to extend the effective width on the end of the boom

_____c. Uniform pattern across its width; used for band spraying

_____d. Circular pattern with little or no spray in the center; used for spraying foliage

_____e. Wide angle spray pattern; used for broadcast spraying

_____f. Narrow oval pattern with lighter edges; used for broadcast spraying

_____g. Compact jet used in handguns to spray a distant target or fixed to apply a narrow band or to inject into the soil

1. Broadcast
2. Flooding flat fan
3. Hollow cone
4. Solid (full) cone
5. Solid stream
6. Regular flat fan
7. Even flat fan

8. Tell why it is important to calibrate equipment.

a.

b.

c.

9. Describe the procedure for calibrating pesticide application equipment by arithmetic calculation.

10. Calculate the problems below, showing your work.

a. What type of equipment would you use to apply De Weed?

(NOTE: Refer to the label on the following page.)

b. Calibration

FACTS:
One acre = 43,560 square feet
One mile per hour = 88 feet per minute
Spray boom width = 20 feet
Speed sprayer travels = 5 mph
Sprayer pumps = 15 gallons in 5 minutes

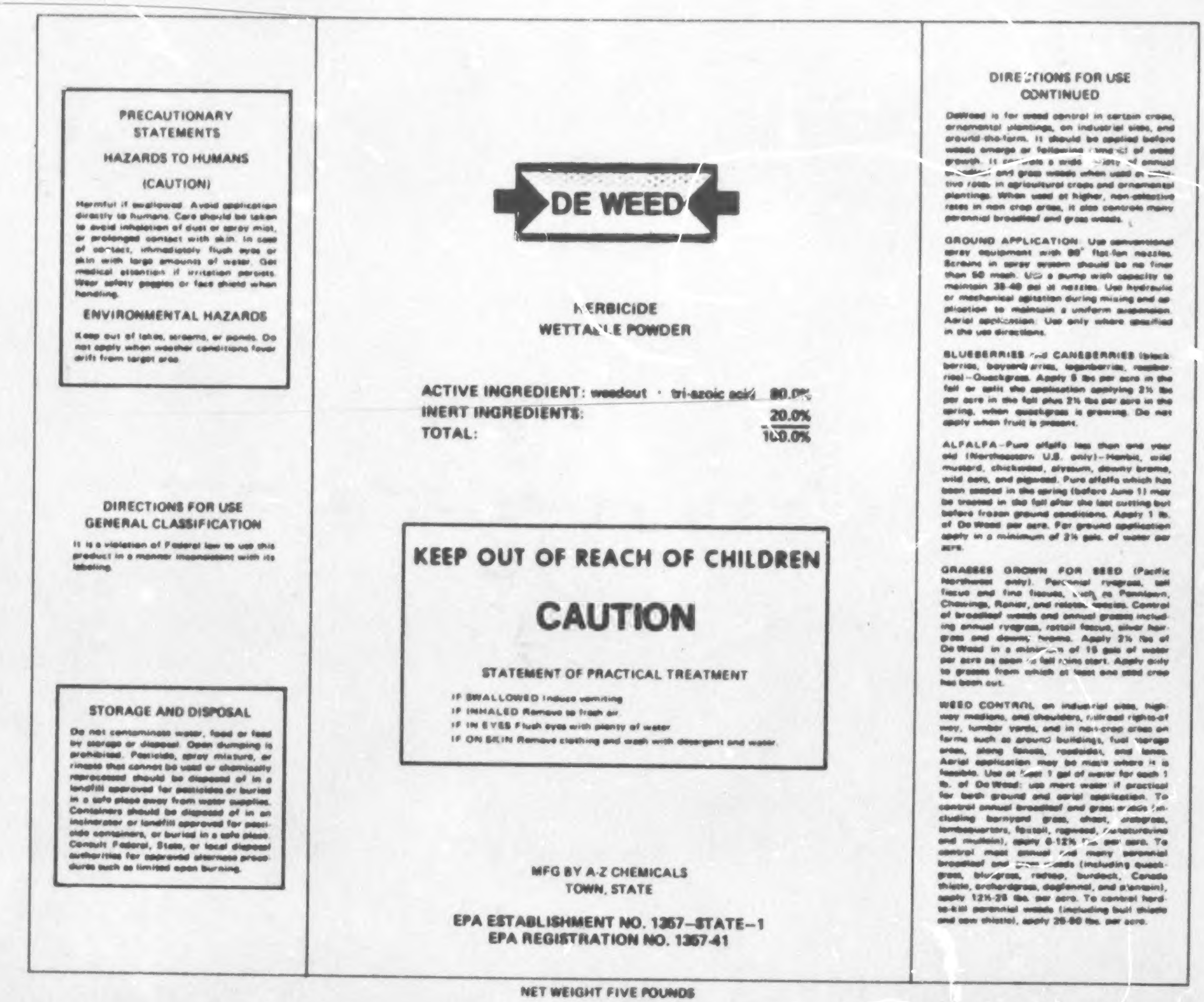
1) What is the pumping rate? (gallons pumped ÷ time)

2) How many feet per minute does your sprayer travel? (speed x feet per minute)

3) How many square feet does your sprayer cover in one minute? (width of sprayer boom x feet covered per minute)

4) How many minutes would it take to spray one acre? (area in one acre ÷ area covered in one minute)

5) How much spray do you pump per acre? (pumping rate x time to cover one acre)



PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS

(CAUTION)

Harmful if swallowed. Avoid application directly to humans. Care should be taken to avoid inhalation of dust or spray mist, or prolonged contact with skin. In case of contact, immediately flush eyes or skin with large amounts of water. Get medical attention if irritation persists. Wear safety goggles or face shield when handling.

ENVIRONMENTAL HAZARDS

Keep out of lakes, streams, or ponds. Do not apply when weather conditions favor drift from target area.

DIRECTIONS FOR USE GENERAL CLASSIFICATION

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

STORAGE AND DISPOSAL

Do not contaminate water, food or feed by storage or disposal. Open dumping is prohibited. Pesticide, spray mixture, or rinsate that cannot be used or chemically reprocessed should be disposed of in a landfill approved for pesticides or buried in a safe place away from water supplies. Containers should be disposed of in an incinerator or landfill approved for pesticide containers, or buried in a safe place. Consult Federal, State, or local disposal authorities for approved alternate procedures such as limited open burning.

DE WEED

HERBICIDE
WETTABLE POWDER

ACTIVE INGREDIENT: weedout · tri-azoic acid	80.0%
INERT INGREDIENTS:	20.0%
TOTAL:	100.0%

KEEP OUT OF REACH OF CHILDREN

CAUTION

STATEMENT OF PRACTICAL TREATMENT

IF SWALLOWED Induce vomiting
IF INHALED Remove to fresh air
IF IN EYES Flush eyes with plenty of water
IF ON SKIN Remove clothing and wash with detergent and water.

MFG BY A-Z CHEMICALS
TOWN, STATE

EPA ESTABLISHMENT NO. 1367–STATE–1
EPA REGISTRATION NO. 1367-41

NET WEIGHT FIVE POUNDS

DIRECTIONS FOR USE CONTINUED

DeWeed is for weed control in certain crops, ornamental plantings, on industrial sites, and around-the-farm. It should be applied before weeds emerge or following removal of weed growth. It controls a wide variety of annual broadleaf and grass weeds when used at selective rates in agricultural crops and ornamental plantings. When used at higher, non-selective rates in non crop areas, it also controls many perennial broadleaf and grass weeds.

GROUND APPLICATION: Use conventional spray equipment with 80° flat-fan nozzles. Screens in spray system should be no finer than 50 mesh. Use a pump with capacity to maintain 35-40 psi at nozzles. Use hydraulic or mechanical agitation during mixing and application to maintain a uniform suspension. Aerial application: Use only where specified in the use directions.

BLUEBERRIES and CANEBERRIES (blackberries, boysenberries, loganberries, raspberries)—Quackgrass. Apply 5 lbs per acre in the fall or split the application applying 2½ lbs per acre in the fall plus 2½ lbs per acre in the spring, when quackgrass is growing. Do not apply when fruit is present.

ALFALFA—Pure alfalfa less than one year old (Northeastern U.S. only)—Henbit, wild mustard, chickweed, alyssum, downy brome, wild oats, and pigweed. Pure alfalfa which has been seeded in the spring (before June 1) may be treated in the fall after the last cutting but before frozen ground conditions. Apply 1 lb. of DeWeed per acre. For ground application apply in a minimum of 2½ gals. of water per acre.

GRASSES GROWN FOR SEED (Pacific Northwest only). Perennial ryegrass, tall fescue and fine fescues, such as Pennlawn, Chewings, Ranier, and related species. Control of broadleaf weeds and annual grasses including annual ryegrass, rattail fescue, silver hairgrass and downy brome. Apply 2½ lbs of DeWeed in a minimum of 15 gals of water per acre as soon as fall rains start. Apply only to grasses from which at least one seed crop has been cut.

WEED CONTROL on industrial sites, highway medians, and shoulders, railroad rights-of-way, lumber yards, and in non-crop areas on farms such as around buildings, fuel storage areas, along fences, roadsides, and lanes. Aerial application may be made where it is feasible. Use at least 1 gal of water for each 1 lb. of DeWeed; use more water if practical for both ground and aerial application. To control annual broadleaf and grass weeds (including barnyard grass, cheat, crabgrass, lambsquarters, foxtail, ragweed, puncturevine and mullein), apply 6-12½ lbs. per acre. To control most annual and many perennial broadleaf and grass weeds (including quackgrass, bluegrass, redtop, burdock, Canada thistle, orchardgrass, dogfennel, and plantain), apply 12½-25 lbs. per acre. To control hard-to-kill perennial weeds (including bull thistle and sow thistle), apply 25-50 lbs. per acre.

EQUIPMENT AND ITS USE
UNIT IX

ANSWERS TO TEST

1. a. 4 f. 7
   b. 1 g. 3
   c. 9 h. 8
   d. 5 i. 6
   e. 2

2. a. Air blast sprayer or mist blower
   b. Granular applicator
   c. Low pressure field sprayer
   d. Back rubber
   e. High pressure field sprayer
   f. Dipping vat

3. Any three of the following:
   a. Filler pump
   b. Tank truck
   c. Nurse or mixing tank
   d. Front-end loader
   e. Tractor

4. Discussion should include:
   a. Saves time
   b. Saves money
   c. Provides more thorough application
   d. Applies pesticides correctly

5.

Equipment	Advantages	Disadvantages
High pressure field sprayer	Well-built; long life; usually has mechanical agitation; very versatile	Expensive; requires large amounts of water, power, and fuel; heavy tire loads; drift hazard
Low pressure field sprayer	Low cost; lightweight; covers large areas rapidly	Low volume output limits use; limits pesticide penetration; agitation is limited
Granular applicator	Lightweight; no water needed; often used as fertilizer spreader or seeder	High cost of pesticide; limited foliar use; must calibrate for each size of granule

6. Any five of the following:

   a. Wear protective clothing and equipment as called for on the label

   b. Follow ALL safety precautions stated on the label

   c. Check equipment for leaks

   d. Use all of the pesticide mix in the sprayer

   e. Wash equipment before storing

   f. Release pressure

   g. Wash out tank and dispose of residue properly

   h. Flush nozzles with clean water

7.

a.	4	e.	2
b.	1	f.	6
c.	7	g.	5
d.	3		

8. a. Obtain desired control

   b. Practice good economics

   c. Apply proper dosage of the pesticide

9. Description should include:

   a. Determine pumping rate

      1) Fill spray tank completely full of water

      2) Put vehicle in neutral at the throttle setting (rpm) desired

      3) Open the spray valve and pump for a predetermined time

      4) Close valve, shut down the equipment, and measure the amount of water needed to refill the tank

      5) Divide the number of gallons by time to get pumping rate

   b. Determine gallons per acre

      1) Determine the number of feet the sprayer moves at the desired speed and throttle

      2) Measure the width of the sprayer boom

      3) Determine the pumping rate

      4) Figure the area that the sprayer covered in one minute (distance traveled x boom width)

      5) Figure how many minutes it would take to spray one acre (divide 43,560 by the area covered in one minute)

      6) Figure the amount of spray pumped per acre (pumping rate x number of minutes per acre)

10. a. Low pressure field sprayer

    b. 1) 3 gallons per minute

       2) 440 feet per minute

       3) 8800 square feet per minute

       4) 5 minutes

       5) 15 gallons per acre

DISPOSAL AND STORAGE
UNIT X

TERMINAL OBJECTIVE

After completion of this unit, the student should be able to discuss proper methods for disposing of surplus pesticides and pesticide containers. The student should be able to name safety considerations when disposing and storing pesticides and pesticide containers, name steps to follow when rinsing pesticide containers, and interpret labels. This knowledge will be evidenced through demonstration and by scoring eighty-five percent on the unit test.

SPECIFIC OBJECTIVES

After completion of this unit, the student should be able to:

1. Match terms associated with disposal and storage to the correct definitions.
2. Name the classifications for disposal of empty pesticide containers.
3. Name steps to follow when rinsing pesticide containers.
4. Name methods for disposal of pesticides and pesticide containers.
5. Discuss in a short paragraph the proper method for disposing of surplus pesticides.
6. Name safety considerations when disposing of pesticides and pesticide containers.
7. Name requirements of a storage area.
8. Discuss in a short paragraph factors to consider in selecting a storage area.
9. Discuss in a short paragraph procedures for handling damaged containers in the storage area.
10. Name factors to consider when arranging pesticide containers within the storage area.
11. Name the reason for storing herbicides separately.
12. Interpret labels correctly by answering questions related to disposal and storage.

DISPOSAL AND STORAGE
UNIT X

SUGGESTED ACTIVITIES

I. Instructor:

   A. Provide student with objective sheet.

   B. Provide student with information and assignment sheets.

   C. Discuss terminal and specific objectives.

   D. Make transparencies.

   E. Discuss information and assignment sheets.

   F. Take field trip to see a good storage area.

   G. Secure resource person to come to class and talk about qualifications of disposal of pesticides and/or pesticide containers at local landfill.

   H. Give test.

II. Student:

   A. Read objective sheet.

   B. Study information sheet.

   C. Complete assignment sheet.

   D. Go on field trip to see a storage area.

   E. Take test.

INSTRUCTIONAL MATERIALS

I. Objective sheet

II. Information sheet

III. Transparency masters

   A. TM 1--Container Classification

   B. TM 2--Rinsing Drums

   C. TM 3--Disposal of Containers

   D. TM 4--Storage Area

IV. Assignment Sheet #1–Interpret Labels

V. Answers to assignment sheet

VI. Test

VII. Answers to test

DISPOSAL AND STORAGE
UNIT X

INFORMATION SHEET

I. Terms and definitions

A. Disposal--Act or process of discarding or throwing away; can include recycling, deposit-return, reuse, or burning

(NOTE: This should be done carefully and safely.)

B. Downwind--Side towards which the prevailing wind is blowing

C. Encapsulation--Method of disposal of pesticides and pesticide containers by sealing them in sturdy, waterproof, chemical-proof container which is then sealed in thick plastic, steel, or concrete to resist damage or breakage

(NOTE: The whole package is then usually buried in an area where water could not be contaminated even if leakage occurs.)

D. Herbicide--Pesticide that is used to control unwanted plants

E. Incinerator--Special high-heat furnace or burner which reduces everything to nontoxic ashes and vapor

F. Soil injection--Method of disposal of pesticides by putting them within the plow layer of soil by usual tillage practices

G. Monitoring system--Regular system of keeping track of and checking up on whether or not pesticides are escaping into the environment

H. Original container--Package (bag, can, or bottle) in which a pesticide is sold

(NOTE: The package must have a label telling what the pesticide is, how to use it correctly and safely, and how to safely dispose of the empty container.)

I. Pollute--To make unclean or unsafe

J. Diluent--Liquid, such as water, kerosene, alcohol, or dust, which "waters down" or weakens a concentrated pesticide

K. Contaminate--Pollute or make unfit for use

L. Sensitive--Easily injured

II. Classifications for disposal of empty pesticide containers (Transparency 1)

A. Burnable containers

(NOTE: Small quantities, usually the amount emptied in one day, of paper and cardboard pesticide containers may be burned if local laws allow burning in your area.)

(CAUTION: Before burning check local, state, and federal regulations.)

B. Nonburnable containers

(NOTE: These are usually metal, glass, or plastic containers.)

C. Containers with mercury, lead, cadmium, arsenic, or inorganic pesticides

(NOTE: These containers may be cardboard, paper, metal, plastic or glass and should be handled differently from other pesticide containers. They are special because the type of pesticide they contain is very persistent in and hazardous to the environment.)

III. Rinsing pesticide containers (Transparency 2)

A. Empty the container into the tank and let it drain 30 seconds

B. Fill it one-fifth to one-fourth full of water or other diluent

C. Replace cap and rotate container to rinse all sides

D. Drain rinse from container into tank and let drain for 30 seconds

E. Repeat rinse and drain a total of three (3) times

IV. Methods for disposal of pesticides and pesticide containers (Transparency 3)

A. Open burning

(NOTE: Check local regulations. In some areas burnable containers may be burned on the farm in small quantities, usually the amount emptied in one day. Never burn containers which held 2,4-D type herbicides because the smoke could injure sensitive plants.)

B. Burial

(NOTE: Many landfills will accept triple-rinsed pesticide containers, especially if broken, crushed, or cut apart. Otherwise, the burial site should be selected in an area where water will not be contaminated and where public health and the environment will not be harmed. Do not bury pesticides and unrinsed pesticide containers that contain mercury, lead, cadmium, arsenic, or inorganic pesticides unless they are encapsulated. Some landfills will take these containers if they have been triple rinsed.)

C. Recycling

(NOTE: Some nonburnable containers, such as plastic and steel drums, may be returned to the manufacturer for reuse.)

INFORMATION SHEET

D. Incineration in a special pesticide-approved incinerator

(NOTE: Some pesticides and pesticide containers may be made harmless using this method. However, this method may not be used for pesticides or pesticide containers with mercury, lead, cadmium arsenic, or inorganic pesticides.)

E. Chemical degradation

(NOTE: Sometimes pesticides can be chemically broken down into nontoxic materials. These methods are specific for each chemical and cannot be described here. Check with the manufacturer or local Environmental Protection Agency officials for specific methods.)

F. Soil injection

(NOTE: Use soil injection methods only when recommended by state or federal regulatory officials.)

G. Encapsulation

(NOTE: This is usually the only method of disposal of pesticides or unrinsed containers with mercury, lead, cadmium, arsenic, or inorganic pesticides.)

V. Disposing of surplus pesticides

A. Try to find other areas with the same problem and use up any extra tank mix, if you mix too much pesticide for a job

B. Return unused pesticides to manufacturer

(NOTE: Check with the company and see if it will take the pesticide back. If, for some reason, it will not take the pesticide back, return the pesticide to your storage area or dispose of it safely by incineration or by encapsulation and burial.)

C. Use one of the other disposal methods listed after consulting an expert

VI. Safety considerations when disposing of pesticides and pesticide containers

A. Location of sensitive areas, especially streams, ponds, and other water supplies

B. Personal safety

C. Environmental safety

VII. Requirements of storage area (Transparency 4)

A. Child-proof

B. Cool, dry, well-ventilated room or building

INFORMATION SHEET

- C. Fire-resistant
- D. Fenced in or at least able to be locked
- E. Warning signs posted on doors and windows

  (NOTE: Warning signs should read: Danger! Pesticides! Keep Out!)

- F. Supplied with detergent, hand cleaner, and water
- G. Supplied with absorbent materials, such as sand, sawdust, and paper

  (NOTE: These materials can be used to soak up spills.)

- H. Supplied with shovel, broom, dust pan, and fire extinguisher

VIII. Selecting the storage area

- A. Where water supply will not be contaminated even if there is an accident or fire
- B. Free from flooding
- C. Downwind and downhill from sensitive area
- D. No problem with runoff or drainage

IX. Handling damaged containers in storage area

- A. Check containers often for leaks, corrosion, and loose caps

  (NOTE: Clean up any leaks right away.)

- B. Store pesticides in original containers

  (NOTE: This statement holds true unless the original container breaks, leaks, or corrodes.)

- C. Label any substitute containers with the entire label

  (NOTE: Unlabeled pesticides are worthless since you don't know what they are or how to use them. They should be treated as surplus pesticides and held for disposal.)

- D. Keep partly empty pesticide containers tightly closed
- E. Wear protective clothing and equipment

INFORMATION SHEET

X. Arranging pesticide containers within storage area

   A. Separate similar containers to avoid the chance of a mistake

   B. Store containers with label in plain sight

   C. Store on shelves off the floor

   D. Keep containers in upright position to prevent spills

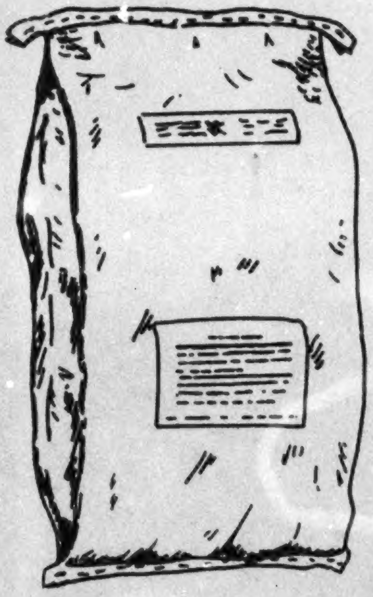
   E. Place containers in orderly rows

XI. Reason for storing herbicides separately--Some herbicides, such as 2,4-D, can vaporize (become a gas) and get into other pesticides nearby

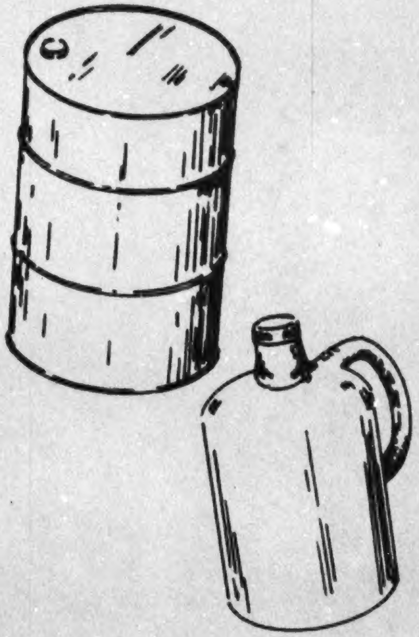
(NOTE: Your storage area needs to be divided with a special area for storing herbicides. All highly toxic pesticides should be stored together.)

Container Classification

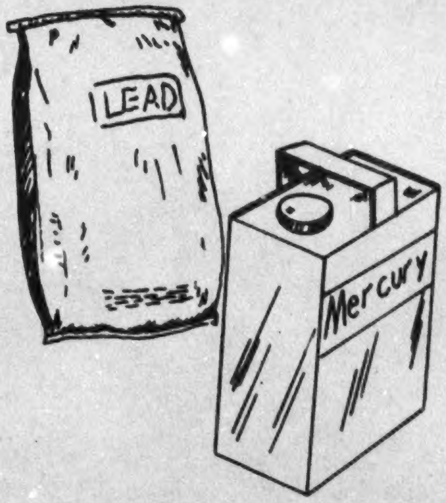
Burnable



Nonburnable

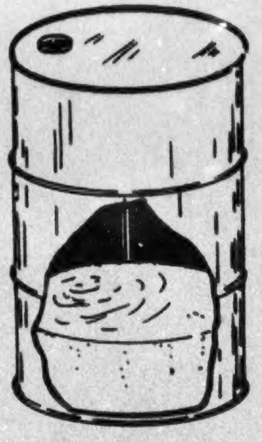


Mercury, Lead, Arsenic
Cadmium and
Inorganic Pesticides

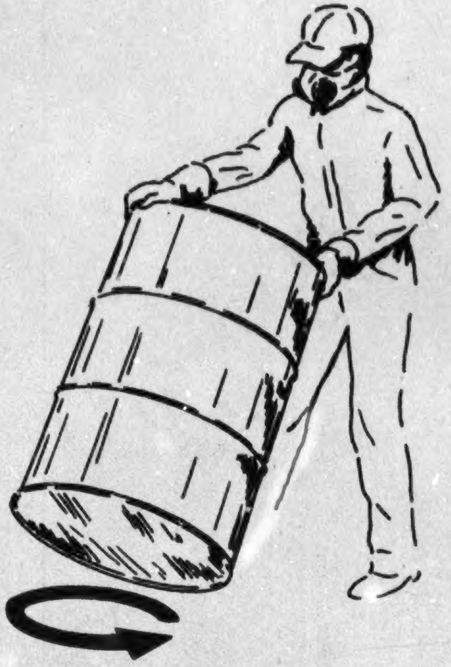

LEAD
Mercury

Rinsing Drums

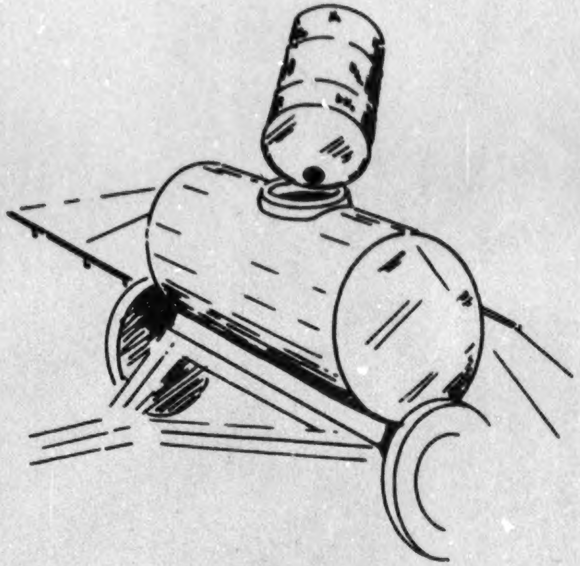
Rinse and Drain - Three Separate Times



Fill 50 Gallon
Drum ¼ Full



Rotate With
Lip on Ground

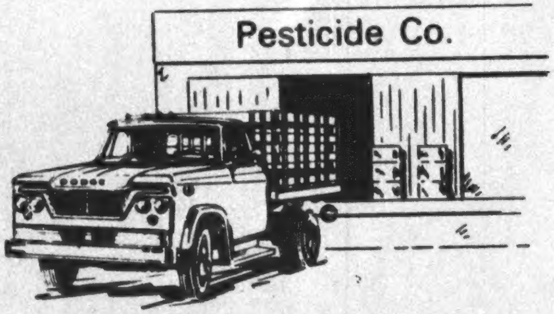


Drain Into Spray Tank

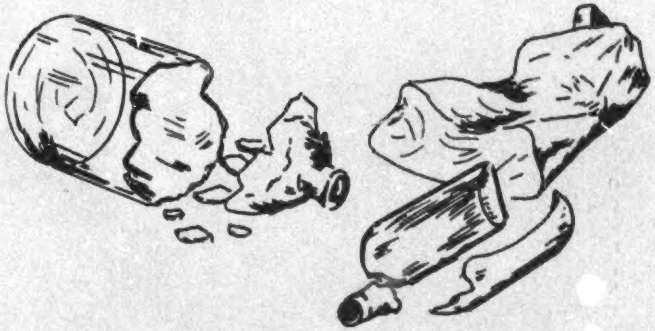
TM 3

Disposal of Containers

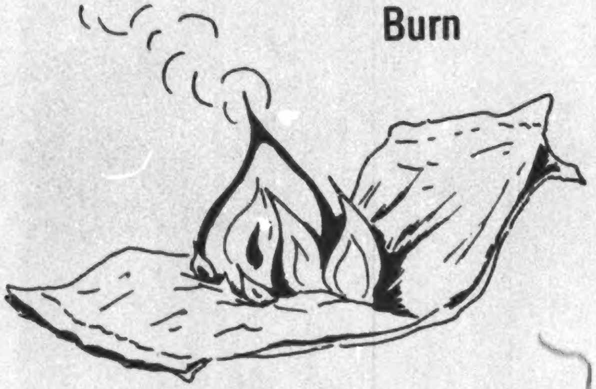
Recycling


Pesticide Co.

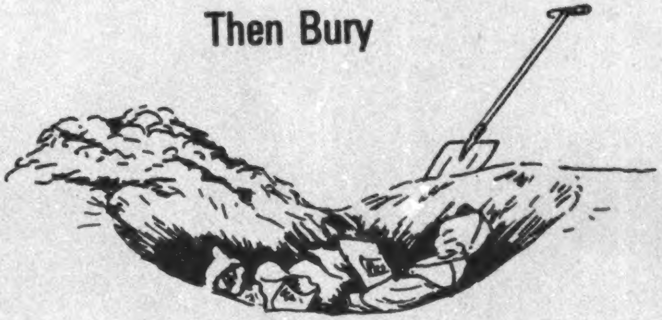
Break, Crush, or Cut Apart



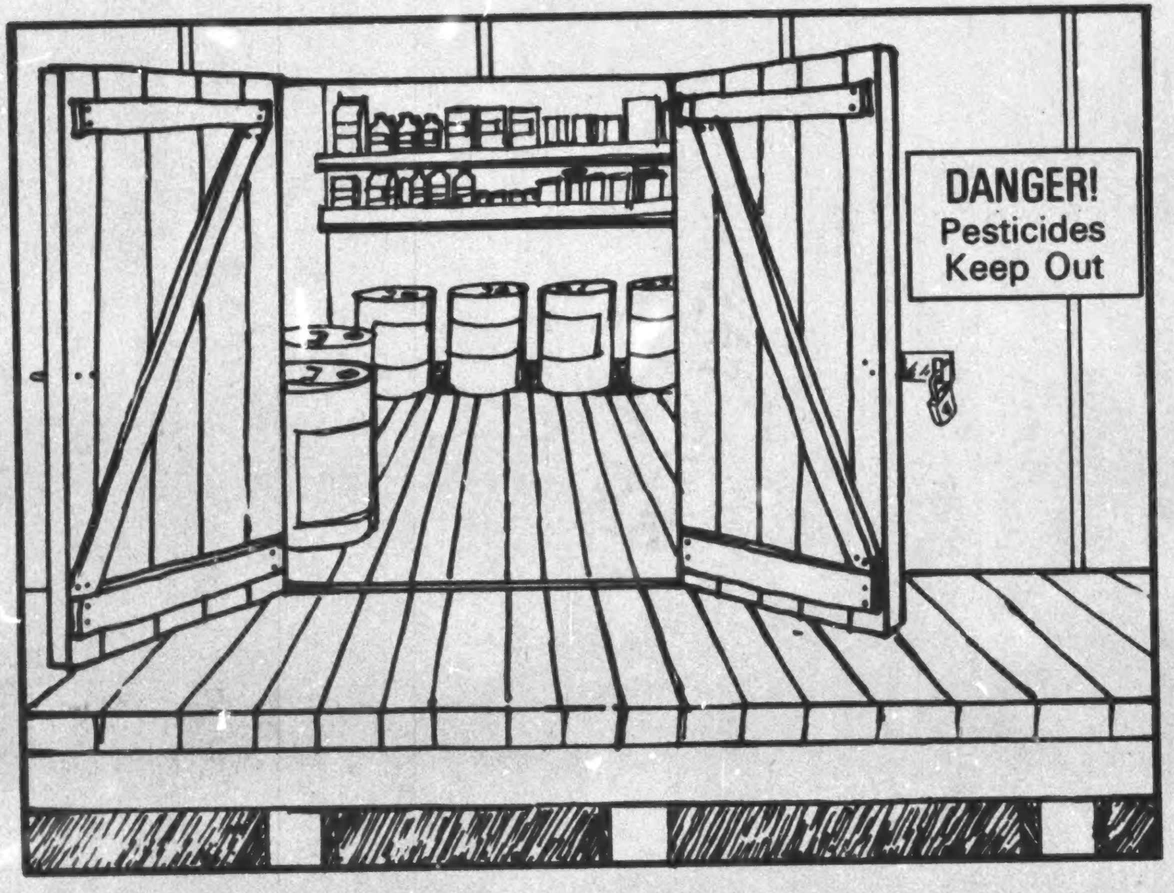
Burn



Then Bury



Storage Area


DANGER!
Pesticides
Keep Out

DISPOSAL AND STORAGE
UNIT X

ASSIGNMENT SHEET #1–INTERPRET LABELS

The purpose of this assignment is to allow you to locate important information that must be contained on all pesticide labels. Read each of the labels on the following pages and answer the questions below pertaining to the specific label. When completed return to instructor for evaluation.

1. 2,4-D label
    a. This granular pesticide is sold in a 50 lb paper bag. How would you dispose of it?
    b. What special storage and transportation precautions would you take?
2. De Metho label
    a. What classification is this plastic bottle container?
    b. How do you dispose of this container?
    c. How should you store this container?
    d. If you mixed too much spray for your alfalfa field (4 pints/acre rate), name two other crops on which you could use the extra spray. This would have to apply only if they had not recently been sprayed and had an insect infestation.
3. No-Disease label
    a. How would you store this pesticide?
    b. What special storage precautions must you take?

c. What classification is this container?

d. How would you dispose of this container?

4. Anti-Weed

   a. How would you store this pesticide?

   b. What classification is this paper bag container?

   c. How would you dispose of this container?

1. 2,4-D label

ACTIVE INGREDIENT:
Isooctyl ester of 2, 4-dichlorophenoxyacetic acid* 30.15%
INERT INGREDIENT 69.85%

*Equivalent to 20% 2,4-dichlorophenoxyacetic acid.
U. S. Pat. Nos. 2,390,941 2,396,513 2,453,983 2,472,347

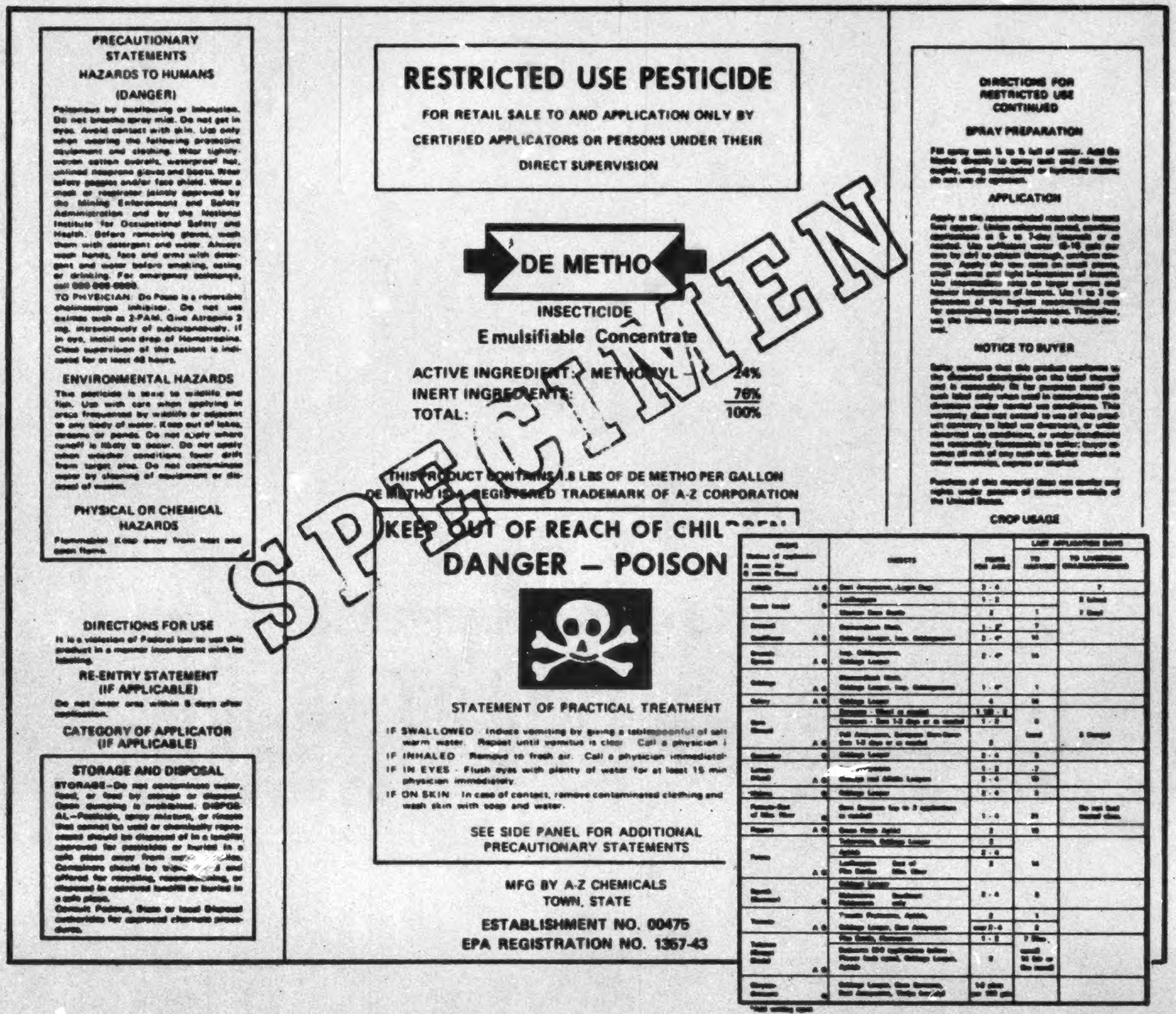
CAUTION: Keep Out of Reach of Children

CAUTION: Harmful if swallowed. Avoid contact with skin, eyes, or clothing. Do not take internally. In case of contact, flush eyes with plenty of water; wash skin with soap and water. Avoid inhalation.

Avoid possible drift to susceptible plants as this product may injure cotton, tobacco, blackeyed peas, beans, tomatoes, melons, other vegetables, grapes, fruit trees, and some ornamentals. It is difficult to completely remove traces of 2,4-D from equipment, therefore do not use such equipment for purposes where even trace amounts of this chemical may cause injury to susceptible crops. Do not reuse shipping containers. Destroy by burying. Avoid contamination of water intended for irrigation and domestic use. Do not transport with or store near seeds, fertilizers, insecticides, or fungicides. Vapors from this product may injure susceptible plants in the vicinity.

2.

ASSIGNMENT SHEET #1



PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS

(DANGER)

TO PHYSICIAN:

ENVIRONMENTAL HAZARDS

PHYSICAL OR CHEMICAL HAZARDS

DIRECTIONS FOR USE

RE-ENTRY STATEMENT (IF APPLICABLE)

CATEGORY OF APPLICATOR (IF APPLICABLE)

STORAGE AND DISPOSAL

STORAGE—

DISPOSAL—

RESTRICTED USE PESTICIDE

FOR RETAIL SALE TO AND APPLICATION ONLY BY CERTIFIED APPLICATORS OR PERSONS UNDER THEIR DIRECT SUPERVISION

DE METHO

INSECTICIDE

Emulsifiable Concentrate

ACTIVE INGREDIENT: METHOMYL — 24%

INERT INGREDIENTS: 76%

TOTAL: 100%

THIS PRODUCT CONTAINS 1.8 LBS OF DE METHO PER GALLON

DE METHO IS A REGISTERED TRADEMARK OF A-Z CORPORATION

KEEP OUT OF REACH OF CHIL

DANGER — POISON

STATEMENT OF PRACTICAL TREATMENT

IF SWALLOWED - Induce vomiting by giving a tablespoonful of salt warm water. Repeat until vomitus is clear. Call a physician i

IF INHALED - Remove to fresh air. Call a physician immediatel

IF IN EYES - Flush eyes with plenty of water for at least 15 min physician immediately.

IF ON SKIN - In case of contact, remove contaminated clothing and wash skin with soap and water.

SEE SIDE PANEL FOR ADDITIONAL PRECAUTIONARY STATEMENTS

MFG BY A-Z CHEMICALS
TOWN, STATE

ESTABLISHMENT NO. 00475
EPA REGISTRATION NO. 1367-43

DIRECTIONS FOR RESTRICTED USE CONTINUED

SPRAY PREPARATION

APPLICATION

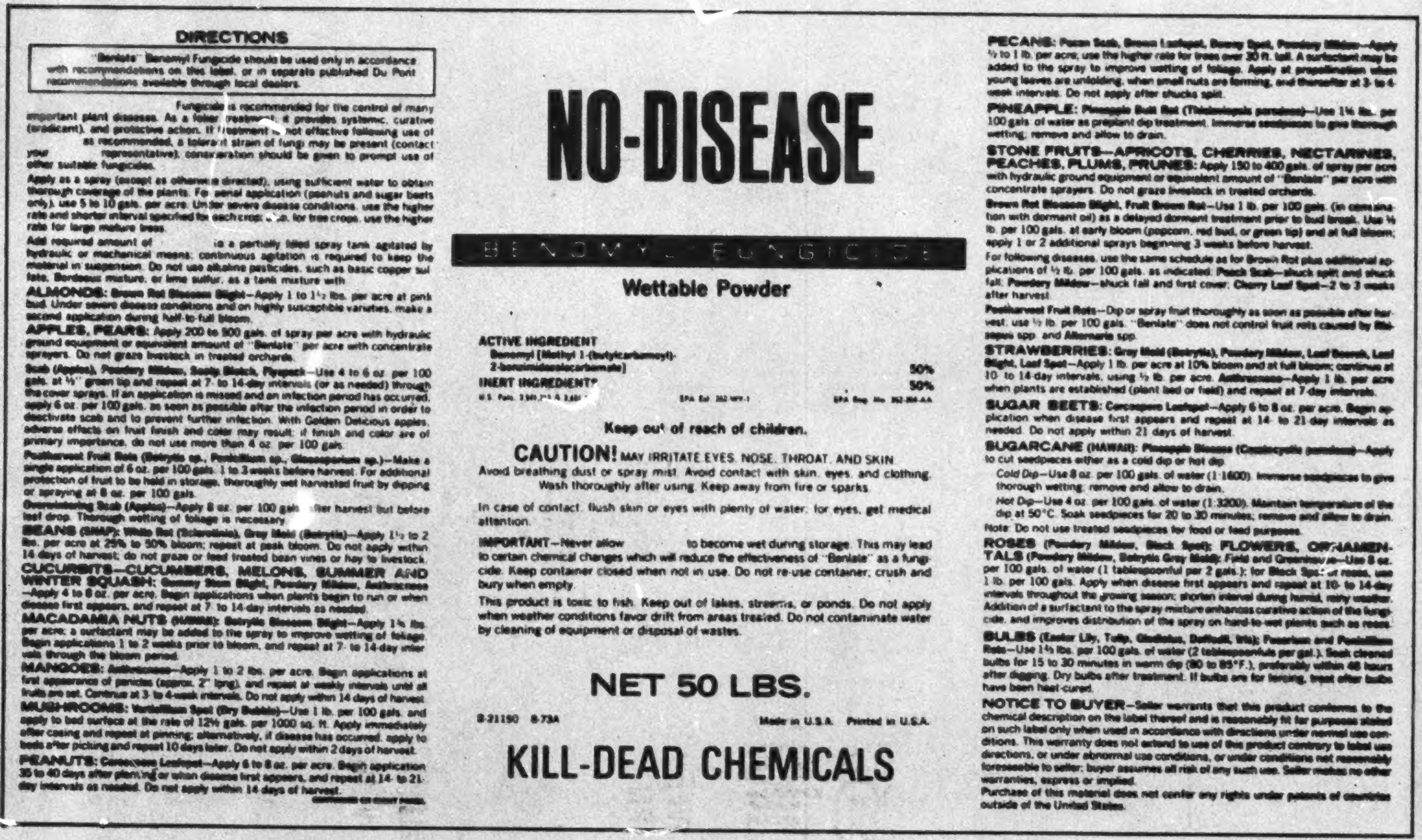
NOTICE TO BUYER

CROP USAGE

SPECIMEN

ASSIGNMENT SHEET #1

3.



DIRECTIONS

"Benlate" Benomyl Fungicide should be used only in accordance with recommendations on this label, or in separate published Du Pont recommendations available through local dealers.

Fungicide is recommended for the control of many important plant diseases. As a foliar treatment, it provides systemic, curative (eradicant), and protective action. If treatment is not effective following use of as recommended, a tolerant strain of fungi may be present (contact your representative); consideration should be given to prompt use of other suitable fungicides.

Apply as a spray (except as otherwise directed), using sufficient water to obtain thorough coverage of the plants. For aerial application (peanuts and sugar beets only), use 5 to 10 gals. per acre. Under severe disease conditions, use the higher rate and shorter interval specified for each crop, e.g., for tree crops, use the higher rate for large mature trees.

Add required amount of to a partially filled spray tank agitated by hydraulic or mechanical means; continuous agitation is required to keep the material in suspension. Do not use alkaline pesticides, such as basic copper sulfate, Bordeaux mixture, or lime sulfur, as a tank mixture with

ALMONDS: Brown Rot Blossom Blight—Apply 1 to 1½ lbs. per acre at pink bud. Under severe disease conditions and on highly susceptible varieties, make a second application during half-to-full bloom.

APPLES, PEARS: Apply 200 to 500 gals. of spray per acre with hydraulic ground equipment or equivalent amount of "Benlate" per acre with concentrate sprayers. Do not graze livestock in treated orchards.

Scab (Apples), Powdery Mildew, Sooty Blotch, Flyspeck—Use 4 to 6 oz. per 100 gals. at ½" green tip and repeat at 7- to 14-day intervals (or as needed) through the cover sprays. If an application is missed and an infection period has occurred, apply 6 oz. per 100 gals. as soon as possible after the infection period in order to deactivate scab and to prevent further infection. With Golden Delicious apples, adverse effects on fruit finish and color may result; if finish and color are of primary importance, do not use more than 4 oz. per 100 gals.

Postharvest Fruit Rots (Botrytis sp., Penicillium sp., Gloeosporium sp.)—Make a single application of 6 oz. per 100 gals. 1 to 3 weeks before harvest. For additional protection of fruit to be held in storage, thoroughly wet harvested fruit by dipping or spraying at 8 oz. per 100 gals.

Overwintering Scab (Apples)—Apply 8 oz. per 100 gals. after harvest but before leaf drop. Thorough wetting of foliage is necessary.

BEANS (SNAP): White Rot (Sclerotinia), Gray Mold (Botrytis)—Apply 1½ to 2 lbs. per acre at 25% to 50% bloom; repeat at peak bloom. Do not apply within 14 days of harvest; do not graze or feed treated bean vines or hay to livestock.

CUCURBITS—CUCUMBERS, MELONS, SUMMER AND WINTER SQUASH: Gummy Stem Blight, Powdery Mildew, Anthracnose—Apply 4 to 8 oz. per acre. Begin applications when plants begin to run or when disease first appears, and repeat at 7- to 14-day intervals as needed.

MACADAMIA NUTS (HAWAII): Botrytis Blossom Blight—Apply 1½ lbs. per acre; a surfactant may be added to the spray to improve wetting of foliage. Begin applications 1 to 2 weeks prior to bloom, and repeat at 7- to 14-day intervals through the bloom period.

MANGOES: Anthracnose—Apply 1 to 2 lbs. per acre. Begin applications at first appearance of panicles (approx. 2" long), and repeat at weekly intervals until all fruits are set. Continue at 3- to 4-week intervals. Do not apply within 14 days of harvest.

MUSHROOMS: Verticillium Spot (Dry Bubble)—Use 1 lb. per 100 gals. and apply to bed surface at the rate of 12½ gals. per 1000 sq. ft. Apply immediately after casing and repeat at pinning; alternatively, if disease has occurred, apply to beds after picking and repeat 10 days later. Do not apply within 2 days of harvest.

PEANUTS: Cercospora Leafspot—Apply 6 to 8 oz. per acre. Begin application 35 to 40 days after planting or when disease first appears, and repeat at 14- to 21-day intervals as needed. Do not apply within 14 days of harvest.

CONTINUED ON RIGHT PANEL

NO-DISEASE

BENOMYL FUNGICIDE

Wettable Powder

ACTIVE INGREDIENT	
Benomyl [Methyl 1-(butylcarbamoyl)-2-benzimidazolecarbamate]	50%
INERT INGREDIENTS	50%

U.S. Pats. 3,541,213 & 3,631,176 EPA Est. 352-WY-1 EPA Reg. No. 352-354-AA

Keep out of reach of children.

CAUTION! MAY IRRITATE EYES, NOSE, THROAT, AND SKIN

Avoid breathing dust or spray mist. Avoid contact with skin, eyes, and clothing. Wash thoroughly after using. Keep away from fire or sparks.

In case of contact, flush skin or eyes with plenty of water; for eyes, get medical attention.

IMPORTANT—Never allow to become wet during storage. This may lead to certain chemical changes which will reduce the effectiveness of "Benlate" as a fungicide. Keep container closed when not in use. Do not re-use container; crush and bury when empty.

This product is toxic to fish. Keep out of lakes, streams, or ponds. Do not apply when weather conditions favor drift from areas treated. Do not contaminate water by cleaning of equipment or disposal of wastes.

NET 50 LBS.

8-21150 8-73A Made in U.S.A. Printed in U.S.A.

KILL-DEAD CHEMICALS

PECANS: Pecan Scab, Brown Leafspot, Downy Spot, Powdery Mildew—Apply ½ to 1 lb. per acre; use the higher rate for trees over 30 ft. tall. A surfactant may be added to the spray to improve wetting of foliage. Apply at prepollination when young leaves are unfolding, when small nuts are forming, and thereafter at 3- to 4-week intervals. Do not apply after shucks split.

PINEAPPLE: Pineapple Butt Rot (Thielaviopsis paradoxa)—Use 1½ lbs. per 100 gals. of water as preplant dip treatment. Immerse seedpieces to give thorough wetting; remove and allow to drain.

STONE FRUITS—APRICOTS, CHERRIES, NECTARINES, PEACHES, PLUMS, PRUNES: Apply 150 to 400 gals. of spray per acre with hydraulic ground equipment or equivalent amount of "Benlate" per acre with concentrate sprayers. Do not graze livestock in treated orchards.

Brown Rot Blossom Blight, Fruit Brown Rot—Use 1 lb. per 100 gals. (in combination with dormant oil) as a delayed dormant treatment prior to bud break. Use ½ lb. per 100 gals. at early bloom (popcorn, red bud, or green tip) and at full bloom; apply 1 or 2 additional sprays beginning 3 weeks before harvest.

For following diseases, use the same schedule as for Brown Rot plus additional applications of ½ lb. per 100 gals. as indicated: Peach Scab—shuck split and shuck fall; Powdery Mildew—shuck fall and first cover; Cherry Leaf Spot—2 to 3 weeks after harvest.

Postharvest Fruit Rots—Dip or spray fruit thoroughly as soon as possible after harvest; use ½ lb. per 100 gals. "Benlate" does not control fruit rots caused by Rhizopus spp. and Alternaria spp.

STRAWBERRIES: Gray Mold (Botrytis), Powdery Mildew, Leaf Scorch, Leaf Blight, Leaf Spot—Apply 1 lb. per acre at 10% bloom and at full bloom; continue at 10- to 14-day intervals, using ½ lb. per acre. Anthracnose—Apply 1 lb. per acre when plants are established (plant bed or field) and repeat at 7-day intervals.

SUGAR BEETS: Cercospora Leafspot—Apply 6 to 8 oz. per acre. Begin application when disease first appears and repeat at 14- to 21-day intervals as needed. Do not apply within 21 days of harvest.

SUGARCANE (HAWAII): Pineapple Disease (Ceratocystis paradoxa)—Apply to cut seedpieces either as a cold dip or hot dip.

Cold Dip—Use 8 oz. per 100 gals. of water (1:1600). Immerse seedpieces to give thorough wetting; remove and allow to drain.

Hot Dip—Use 4 oz. per 100 gals. of water (1:3200). Maintain temperature of the dip at 50°C. Soak seedpieces for 20 to 30 minutes; remove and allow to drain.

Note: Do not use treated seedpieces for food or feed purposes.

ROSES (Powdery Mildew, Black Spot); **FLOWERS, ORNAMENTALS** (Powdery Mildew, Botrytis Gray Mold): *Field and Greenhouse*—Use 8 oz. per 100 gals. of water (1 tablespoonful per 2 gals.); for Black Spot of roses, use 1 lb. per 100 gals. Apply when disease first appears and repeat at 10- to 14-day intervals throughout the growing season; shorten interval during humid, rainy weather. Addition of a surfactant to the spray mixture enhances curative action of the fungicide, and improves distribution of the spray on hard-to-wet plants such as roses.

BULBS (Easter Lily, Tulip, Gladiolus, Daffodil, Iris); Fusarium and Penicillium Rots—Use 1½ lbs. per 100 gals. of water (2 tablespoonfuls per gal.). Soak cleaned bulbs for 15 to 30 minutes in warm dip (80 to 85°F.), preferably within 48 hours after digging. Dry bulbs after treatment. If bulbs are for forcing, treat after bulbs have been heat-cured.

NOTICE TO BUYER—Seller warrants that this product conforms to the chemical description on the label thereof and is reasonably fit for purposes stated on such label only when used in accordance with directions under normal use conditions. This warranty does not extend to use of the product contrary to label use directions, or under abnormal use conditions, or under conditions not reasonably foreseeable to seller; buyer assumes all risk of any such use. Seller makes no other warranties, express or implied.

Purchase of this material does not confer any rights under patents of countries outside of the United States.

ASSIGNMENT SHEET #1

4.

Anti-Weed

20G

SAMPLE LABEL

Herbicide

FOR WEED CONTROL IN CORN

50 Pounds

NET WEIGHT

Active Ingredients:	20.0%
Atrazine: 2-chloro-4-Ethylamino-6-isopropylamino-s-triazine . . .	6.32%
Related compounds . .	.34%
2-chloro-N-isopropyl-acetanilide . .	13.34%
Inert Ingredients:	80.0%
Total:	100.0%

EPA Reg. No. 1000-519

Anti-Weed 20G is a granular herbicide

Warning:

Keep out of reach of children. See additional warning statements on back of bag.

KILL-DEAD

Chemical Company

ASSIGNMENT SHEET #1

DIRECTIONS FOR USE AND CONDITIONS OF SALE AND WARRANTY

IMPORTANT: Read the entire **Directions For Use** and the **Conditions Of Sale And Warranty** before using this product.

Conditions Of Sale And Warranty

The **Directions For Use** of this product reflect the opinion of experts based on field use and tests. The directions are believed to be reliable and should be followed carefully. However, it is impossible to eliminate all risks inherently associated with use of this product. Crop injury, ineffectiveness or other unintended consequences may result because of such factors as weather conditions, presence of other materials or the manner of use or application all of which are beyond the control of or the Seller. All such risks shall be assumed by the Buyer.

warrants that this product conforms to the chemical description on the label and is reasonably fit for the purposes referred to in the **Directions For Use**, subject to the inherent risks referred to above. **makes no other express or implied warranty of Fitness or Merchantability or any other express or implied warranty.** In no case shall or the Seller be liable for consequential, special or indirect damages resulting from the use or handling of this product. and the Seller offer this product and the Buyer and user accept it, subject to the foregoing **Conditions Of Sale And Warranty** which may be varied only by agreement in writing signed by a duly authorized representative of

General Information

Anti-Weed will control most annual broadleaf and grass weeds in field corn, silage corn and sweet corn. It should be applied prior to weed and crop emergence.

Since Anti-Weed acts mainly through root absorption, its effectiveness depends on rainfall or irrigation to move it into the root zone. Best results are obtained when moisture occurs within 10 days after application. Should moisture not occur within this period or should weeds develop, a shallow cultivation or rotary hoeing will generally result in better weed control.

Anti-Weed is noncorrosive to equipment and metal surfaces, nonflammable and has low electrical conductivity.

Care should be taken to avoid using Anti-Weed where adjacent desirable trees, shrubs or plants might be injured.

Store Anti-Weed in a dry place.

Application Instructions

Broadcast or Overall Treatment

Use broadcast applicators or fertilizer spreaders that can apply small amounts of granules evenly.

Band Treatment

Use applicators designed for this purpose. Calculate the amount of granules per acre needed for band treatment as follows:

$$\frac{\text{Band Width in Inches}}{\text{Inches Between Crop Rows}} \times \begin{matrix}\text{Recommended}\\ \text{Broadcast Rate}\end{matrix} = \begin{matrix}\text{lbs./Acre}\\ \text{Anti-Weed}\\ \text{for Band}\\ \text{Treatment}\end{matrix}$$

Range of Rates: In each case where a range of rates is given, the lower rate should be used on soils low in organic matter and the higher rate should be used on soils high in organic matter.

Directions for Use

Anti-Weed controls most annual broadleaf and grass weeds such as:

Giant Foxtail
Green Foxtail
Yellow Foxtail
Barnyardgrass
(Watergrass)
Crabgrass

Fall Panicum
Annual Morningglory
Cocklebur
Sandbur
Jimsonweed
Lambsquarters

Mustard
Pigweed
Ragweed
Smartweed
Sunflower
Velvetleaf

Anti-Weed will not control perennial weeds such as:

Johnsongrass Field Bindweed Canada Thistle Bull Nettle

Apply Anti-Weed at planting behind the press wheel or immediately after planting prior to emergence of either crop or weeds. See table below for recommended rates.

Soil	Rate per acre of Anti-Weed Broadcast
Light soils: Sands, loamy sands, and sandy loams	15 lbs.
Medium to heavy soils including the dark prairie soils in the Corn Belt**	22.5–30 lbs.

*For calculation of band treatment rate, see Application Instructions Section.

** Anti-Weed should not be used on high organic soils such as peat and muck.

Suggestions for Crop Rotations

1) Corn may be replanted at any time following application of Anti-Weed. 2) Sorghum may be seeded in all areas the spring following application of the granules. 3) Soybeans may be seeded in Louisiana, Arkansas, Missouri, Iowa and Southeastern Minnesota and areas east of these states the spring following applications made not later than June 1 of the previous year.

Precautions: 1) Do not plant sugar beets, tobacco, vegetables (including dry beans), spring-seeded small grains or small-seeded legumes and grasses the year following Anti-Weed application or injury may occur. 2) Following harvest of a treated crop, plow (moldboard or disk-plow) and thoroughly till the soil in the fall or spring to minimize possible injury to rotational spring-seeded crops. 3) Injury to rotational crops following application may occur on eroded hillsides, alkali outcroppings, gravelly areas and on soils in general with pH near or exceeding 7.5. 4) Do not graze treated area or feed treated forage to livestock for 21 days following application.

Warning

Keep out of reach of children.

Irritating to skin, eyes, nose and throat. May be harmful if swallowed. May cause allergic skin reaction. Do not get in eyes, on skin or on clothing. Avoid breathing dust. Do not take internally. While handling, wear rubber gloves. In case of contact, flush skin or eyes with plenty of water; for eyes, get medical attention. Launder clothing before reuse. Avoid contamination of seed, feed and foodstuffs.

This product is toxic to fish. Keep out of lakes, ponds and streams.

Do not reuse container. Destroy when empty.

DISPOSAL AND STORAGE
UNIT X

ANSWERS TO ASSIGNMENT SHEET

1. 2,4-D label

   a. Burying--Burning bags containing even small amounts of 2,4-D could cause phytotoxicity from smoke which is carrying the 2,4-D vapor

   b. Do not transport or store near seeds, fertilizers, insecticides, or fungicides. Vapors from this product may injure susceptible plants in the vicinity. Do not store near or with food stuffs

2. De Metho label

   a. Nonburnable

   b. Triple rinse, crush, and bury in a safe place or in a local landfill, if legal

   c. In original container away from food or other articles intended for consumption by humans or animals

   d. Cauliflower, brussels sprouts, cabbage, celery, cucumber, head lettuce, melons, peanuts, potatoes, or summer squash

3. No-Disease label

   a. Dry area, locked in a pesticide storage area away from food, feed, and livestock in the original container

   b. Do not allow this pesticide to become wet during storage

   c. Nonburnable

   d. Crush - bury

4. Anti-Weed label

   a. In a dry, locked pesticide storage area away from food, feed, and livestock in the original container

   b. Burnable

   c. Burn

DISPOSAL AND STORAGE
UNIT X

TEST

1. Match the terms on the right to the correct definitions on the left. Place the appropriate numbers in the blanks provided.

_____a. Easily injured

_____b. Act or process of discarding or throwing away; can include recycling, deposit-return, reuse, or burning

_____c. Pollute or make unfit for use

_____d. Side towards which the prevailing wind is blowing

_____e. Liquid, such as water, kerosene, alcohol, or dust, which "waters down" or weakens a concentrated pesticide

_____f. Method of disposal of pesticides and pesticide containers by sealing them in sturdy, waterproof, chemical-proof container which is then sealed in thick plastic, steel, or concrete to resist damage or breakage

_____g. To make unclean or unsafe

_____h. Pesticide that is used to control unwanted plants

_____i. Package (bag, can, or bottle) in which a pesticide is sold

_____j. Special high-heat furnace or burner which reduces everything to nontoxic ashes and vapor

_____k. Regular system of keeping track of and checking up on whether or not pesticides are escaping into the environment

_____l. Method of disposal of pesticides by putting them within the plow layer of soil by usual tillage practices

1. Soil injection
2. Monitoring system
3. Original container
4. Pollute
5. Diluent
6. Contaminate
7. Sensitive
8. Disposal
9. Downwind
10. Encapsulation
11. Herbicide
12. Incinerator

2. Name the classifications for disposal of empty pesticide containers.

   a.

   b.

   c.

3. Name steps to follow when rinsing pesticide containers.

   a.

   b.

   c.

   d.

   e.

4. Name three methods for disposal of pesticides and pesticide containers.

   a.

   b.

   c.

5. Discuss in a short paragraph the proper method for disposing of surplus pesticides.

6. Name safety considerations when disposing of pesticides and pesticide containers.

   a.

   b.

   c.

7. Name five requirements of a storage area.

   a.

   b.

   c.

   d.

   e.

8. Discuss in a short paragraph factors to consider in selecting a storage area.

9. Discuss in a short paragraph procedures for handling damaged containers in the storage area.

10. Name factors to consider when arranging pesticide containers within the storage area.

    a.

    b.

    c.

    d.

    e.

11. Name the reason for storing herbicides separately.

12. Interpret the following De Weed label by answering the questions below.

    a. What classification is this cardboard carton container?

    b. How would you dispose of this container?

    c. If you mixed too much pesticide for your blueberries (5 lbs per acre rate), on what other crop could you use it?

    d. How should you store this pesticide?

PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS

(CAUTION)

Harmful if swallowed. Avoid application directly to humans. Care should be taken to avoid inhalation of dust or spray mist, or prolonged contact with skin. In case of contact, immediately flush eyes or skin with large amounts of water. Get medical attention if irritation persists. Wear safety goggles or face shield when handling.

ENVIRONMENTAL HAZARDS

Keep out of lakes, streams, or ponds. Do not apply when weather conditions favor drift from target area.

DIRECTIONS FOR USE GENERAL CLASSIFICATION

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

STORAGE AND DISPOSAL

Do not contaminate water, food or feed by storage or disposal. Open dumping is prohibited. Pesticide, spray mixture, or rinsate that cannot be used or chemically reprocessed should be disposed of in a landfill approved for pesticides or buried in a safe place away from water supplies. Containers should be disposed of in an incinerator or landfill approved for pesticide containers, or buried in a safe place. Consult Federal, State, or local disposal authorities for approved alternate procedures such as limited open burning.

DE WEED

HERBICIDE
WETTABLE POWDER

ACTIVE INGREDIENT: weedout · tri-azoic acid	80.0%
INERT INGREDIENTS:	20.0%
TOTAL:	100.0%

KEEP OUT OF REACH OF CHILDREN

CAUTION

STATEMENT OF PRACTICAL TREATMENT

IF SWALLOWED Induce vomiting
IF INHALED Remove to fresh air.
IF IN EYES Flush eyes with plenty of water
IF ON SKIN Remove clothing and wash with detergent and water.

MFG BY A-Z CHEMICALS
TOWN, STATE

EPA ESTABLISHMENT NO. 1357–STATE–1
EPA REGISTRATION NO. 1357-41

NET WEIGHT FIVE POUNDS

DIRECTIONS FOR USE CONTINUED

DeWeed is for weed control in certain crops, ornamental plantings, on industrial sites, and around-the-farm. It should be applied before weeds emerge or following removal of weed growth. It controls a wide variety of annual broadleaf and grass weeds when used at selective rates in agricultural crops and ornamental plantings. When used at higher, non-selective rates in non crop areas, it also controls many perennial broadleaf and grass weeds.

GROUND APPLICATION: Use conventional spray equipment with 80° flat-fan nozzles. Screens in spray system should be no finer than 50 mesh. Use a pump with capacity to maintain 35-40 psi at nozzles. Use hydraulic or mechanical agitation during mixing and application to maintain a uniform suspension. Aerial application: Use only where specified in the use directions.

BLUEBERRIES and CANEBERRIES (blackberries, boysenberries, loganberries, raspberries)—Quackgrass. Apply 5 lbs per acre in the fall or split the application applying 2½ lbs per acre in the fall plus 2½ lbs per acre in the spring, when quackgrass is growing. Do not apply when fruit is present.

ALFALFA—Pure alfalfa less than one year old (Northeastern U.S. only)—Henbit, wild mustard, chickweed, alyssum, downy brome, wild oats, and pigweed. Pure alfalfa which has been seeded in the spring (before June 1) may be treated in the fall after the last cutting but before frozen ground conditions. Apply 1 lb. of De Weed per acre. For ground application apply in a minimum of 2½ gals. of water per acre.

GRASSES GROWN FOR SEED (Pacific Northwest only). Perennial ryegrass, tall fescue and fine fescues, such as Pennlawn, Chewings, Renier, and related species. Control of broadleaf weeds and annual grasses including annual ryegrass, rattail fescue, silver hairgrass and downy brome. Apply 2½ lbs of De Weed in a minimum of 15 gals of water per acre as soon as fall rains start. Apply only to grasses from which at least one seed crop has been cut.

WEED CONTROL on industrial sites, highway medians, and shoulders, railroad rights-of-way, lumber yards, and in non-crop areas on farms such as around buildings, fuel storage areas, along fences, roadsides, and lanes. Aerial application may be made where it is feasible. Use at least 1 gal of water for each 1 lb. of De Weed; use more water if practical for both ground and aerial application. To control annual broadleaf and grass weeds (including barnyard grass, cheat, crabgrass, lambsquarters, foxtail, ragweed, puncturevine and mullein), apply 6-12½ lbs. per acre. To control most annual and many perennial broadleaf and grass weeds (including quackgrass, bluegrass, redtop, burdock, Canada thistle, orchardgrass, dogfennel, and plantain), apply 12½-25 lbs. per acre. To control hard-to-kill perennial weeds (including bull thistle and sow thistle), apply 25-50 lbs. per acre.

DISPOSAL AND STORAGE
UNIT X

ANSWERS TO TEST

1. a. 7
   b. 8
   c. 6
   d. 9
   e. 5
   f. 10
   g. 4
   h. 11
   i. 3
   j. 12
   k. 2
   l. 1

2. a. Burnable containers
   b. Nonburnable containers
   c. Containers with mercury, lead, cadmium, arsenic, or inorganic pesticides

3. a. Empty the container into the tank and let it drain 30 seconds
   b. Fill it one-fifth to one-fourth full of water or other diluent
   c. Replace cap and rotate container to rinse all sides
   d. Drain rinse from container into tank and let drain for 30 seconds
   e. Repeat rinse and drain a total of three (3) times

4. Any three of the following:
   a. Open burning
   b. Burial
   c. Recycling
   d. Incineration in a special pesticide-approved incinerator
   e. Chemical degradation
   f. Soil injection
   g. Encapsulation

5. Discussion should include:
   a. Try to find other areas with the same problem and use up any extra tank mix, if you mix too much pesticide for a job
   b. Return unused pesticides to manufacturer
   c. Use one of the other disposal methods listed after consulting an expert

6. a. Location of sensitive areas, especially streams, ponds, and other water supplies

   b. Personal safety

   c. Environmental safety

7. Any five of the following:

   a. Child-proof

   b. Cool, dry, well-ventilated room or building

   c. Fire-resistant

   d. Fenced in or at least able to be locked

   e. Warning signs posted on doors and windows

   f. Supplied with detergent, hand cleaner, and water

   g. Supplied with absorbent materials, such as sand, sawdust, and paper

   h. Supplied with shovel, broom, dust pan, and fire extinguisher

8. Discussion should include:

   a. Where water supply will not be contaminated even if there is an accident or fire

   b. Free from flooding

   c. Downwind and downhill from sensitive area

   d. No problem with runoff or drainage

9. Discussion should include:

   a. Check containers often for leaks, corrosion, and loose caps

   b. Store pesticides in original containers

   c. Label any substitute containers with the entire label

   d. Keep partly empty pesticide containers tightly closed

   e. Wear protective clothing and equipment

10. a. Separate similar containers to avoid the chance of a mistake

   b. Store containers with label in plain sight

   c. Store on shelves off the floor

   d. Keep containers in upright position to prevent spills

   e. Place containers in orderly rows

11. Some herbicides, such as 2,4-D, can vaporize (become a gas) and get into other pesticides nearby

12. a. Burnable

    b. Open burning if allowed by federal, state, and local laws. Otherwise, bury in an approved landfill or in a safe place away from water supplies or in an incinerator

    c. Caneberries

    d. In original container in a dry, locked pesticide storage area where water, food, and feed will not be contaminated

RECORD KEEPING AND LIABILITY
UNIT XI

TERMINAL OBJECTIVE

After completion of this unit, the student should be able to list reasons for keeping records of pesticide use, complete standard record keeping form, name common claims brought against applicators, and describe things to do when involved in a legal problem. This knowledge will be evidenced through demonstration and by scoring eighty-five percent on the unit test.

SPECIFIC OBJECTIVES

After completion of this unit, the student should be able to:

1. List reasons for keeping records of pesticide use.
2. List items of information needed for record keeping.
3. Name common claims brought against applicators.
4. List ways in which cross contamination may occur.
5. Describe things to do when involved in a legal problem.
6. Discuss insurance for pesticide mishaps.
7. Complete a standard record keeping form.

RECORD KEEPING AND LIABILITY
UNIT XI

SUGGESTED ACTIVITIES

I. Instructor:

  A. Provide student with objective sheet.

  B. Provide student with information and assignment sheets.

  C. Make transparency.

  D. Discuss terminal and specific objectives.

  E. Discuss information and assignment sheets.

  F. Give test.

II. Student:

  A. Read objective sheet.

  B. Study information sheet.

  C. Complete assignment sheet.

  D. Take test.

INSTRUCTIONAL MATERIALS

I. Objective sheet

II. Information sheet

III. Transparency master: TM 1--Spray Record Sheet

IV. Assignment Sheet #1--Complete Standard Record Keeping Form

V. Answers to assignment sheet

VI. Test

VII. Answers to test

RECORD KEEPING AND LIABILITY
UNIT XI

INFORMATION SHEET

I. Reasons for keeping records of pesticide use

   A. Help in finding an error if an error is made

   B. Provide information to trace residue and/or damage problems

   C. Help save money

   D. Allow one to compare the results obtained from different pesticides

   E. Help to reduce pesticide misuse

   F. Provide guide to buying specific amount of pesticide needed

   G. Establish proof of proper use in damage suit

II. Items of information needed for record keeping (Transparency 1)

   A. Date and time of application

   B. Area or target treated and pest

   C. Equipment used

   D. Name of product, formulation, lot number, establishment number, and rate

   E. Total formulation added to tank or hopper

   F. Amount of mixture used

   G. Amount treated and location

   H. Additional comments

   (NOTE: The more information included on the record, the more useful the record will be. Carry a notebook in the field to have all the information right there in front of you. Fill in a standard form to be sure you get all the necessary data every time.)

III. Common claims brought against applicators

   A. Drift

   (NOTE: Drifting pesticides are a major cause of environmental contamination and damage to nontarget areas. In general, the courts have held the applicator and the grower who hired him jointly liable in drift cases. The grower is responsible when he hires or contracts for a "particularly dangerous operation," such as the application of pesticides. However, don't depend on the grower to share costs. He may file another suit against you claiming that you agreed not to cause drift damage. The manufacturer of the pesticide may be held liable in drift cases in certain instances. If the label doesn't clearly warn about the possibility of drift, the manufacturer may share liability.)

INFORMATION SHEET

B. Crop injury

(NOTE: Claims of injury to the crop that was treated or claims that the pesticide had not performed as expected involve the dealer, the manufacturer, and the applicator. The courts must decide which of the three recommended or guaranteed the product for that specific use on that crop. The party in error must accept the blame and pay damages. Applicators must make sure that all the pesticides they use are recommended on the label for that purpose. Then the blame may be the manufacturer's. If the crop injury was not great or total, the grower must show how much damage was from the pesticide and how much was from other conditions, such as weather or disease. This breakdown is not necessary in cases with great or total injury.)

C. Personal injury

(NOTE: The application of pesticides is considered an especially dangerous or, in legal terms, an "ultrahazardous" activity. As a result, the pesticide applicator is liable for any injury to a person from the pesticide. Usually the injured person can recover damages without proving negligence of the applicator. The injured party must only prove that he is free of any negligence and did not assume the risk of pesticide exposure. Pest control operators or exterminators are sometimes a special case. The liability in most cases involving personal injury or death depends on proving the applicator negligent.)

D. Wrong field

(NOTE: If the pesticide is applied on a field, crop, or area other than the one for which it was intended, serious problems can result. In the event that damage or overtolerance occurs or that the owner just didn't want the area treated, the applicator may be charged with trespass. Defense is very difficult. Double check on address, field location, and all landmarks before you treat an area. Applying pesticides to the wrong field can be costly.)

E. Bees

(NOTE: Honeybees are very important to the farmer and often he has his own colonies or hives. Unfortunately, bees are insects and are very susceptible to many pesticides. If the bees in hives are killed as the result of drift from nearby fields, the applicator is usually held legally responsible. Often he must pay damages. However, if the bees contacted the pesticides while in the sprayed fields, the applicator may not be liable. The courts have sometimes ruled that the bee is trespassing and that the land doesn't need to be safe to uninvited animals. Play it safe! Know where the beehives are located in your area. Warn the beekeeper beforehand when and where you will be spraying.)

INFORMATION SHEET

F. Attractive nuisance

(NOTE: The rulings on "attractive nuisance" usually involve cases when children are attracted to ground equipment or aircraft and injure themselves. The owner and/or applicator are held liable for leaving the "nuisance" where a child could be "attracted" to it. In one case, a young boy, seeing a small airplane parked in the corner of an airport, took his ax and chopped the plane into several pieces. Unfortunately, at one point the hatchet hit the plane, then slipped and cut his foot. The court under the "attractive nuisance" claim awarded the boy $5,000 from the airplane's owner.)

G. Noise

(NOTE: Claims have been brought against applicators for noise damage. Owners of mink, poultry, turkey, and occasionally cattle claim injury to their animals from fright caused by noise of aircraft and ground equipment operating above or near their ranch. They must prove direct loss of property due to noise from machinery operated carelessly or negligently. In some cases, the ranch owner will claim that an applicator made an unlawful flight over his property without his permission. This is especially important in aerial applications when pullups over nearby property are necessary. Successful defense is possible when the applicator can show that the noise wasn't the cause of injury or that no injury occurred.)

IV. Ways in which cross contamination may occur

(NOTE: Every year there are cases where a pesticide contains not only the pesticide named on the label but also another pesticide as well.)

A. Manufacturer may make a mistake in labeling or formulating the product

B. Applicator may make a mistake in mixing or filling in the spray tank or he may not have removed from the tank all the pesticide left over from the last application

C. Open container of herbicides, such as 2,4D, can vaporize (become a gas) and penetrate other pesticides which are stored nearby

(NOTE: The applicator must know which container of pesticide was used on the crop so that laboratory tests can be made. The lab tests can show whether the contamination occurred during mixing and filling or earlier. In cases involving herbicide contamination, it is difficult to prove whether it is the result of vaporization during storage or a manufacturer formulation error. The courts must decide who is to blame.)

V. Things to do when involved in a legal problem

A. Examine records to make sure that you were actually operating in the area at the time of the alleged injury

B. Make sure that all of your records are up-to-date, particularly as to the identity of the equipment used, temperatures, wind direction and velocity, and all other pertinent data

C. Proceed to the scene immediately and make notes of all essential information

D. Record any adverse conditions that you observe at the time of your investigation, particularly insect infestations, disease, water stress, late planting, carry-over effect from other materials or herbicides, and age of crop

E. Use close-up color photography to record any adverse condition found

(NOTE: The close-ups are necessary so that symptoms can be examined by an expert.)

F. Save the container from which the product used on the job was removed

(NOTE: If it is not practical to save the whole container, use close-up color photography to record the label.)

G. Request permission to have an expert examine the crop or the property in order to have the benefit of his opinion

(NOTE: This should be done if you do not have insurance for the loss involved.)

H. Notify the chemical company immediately so they can send their experts to the site if they are involved

I. Obtain the names and addresses of all witnesses who might testify as to the nature of the operation and the conditions of the crop before and after application

VI. Insurance for pesticide mishaps

A. Types of insurance plans

1. Bodily injury

2. Property damage

3. Restricted chemical liability

4. Comprehensive chemical

B. Points to consider

1. Cost

2. Benefits

3. Drawbacks

Spray Record Sheet

Date and Time	Area or Target Treated and Pest	Equipment	Formulation, Lot Number, and Rate (per acre, per 100 gallons, etc.)	Total Formulation Added to Tank or Hopper	Amount of Mixture Used	Amount Treated and Location	Additional Comments (Weather, applicator, severity of infestation, etc.)
5/12/73 3-5 PM	Smith's Alfalfa Weevil	Lawrence Blower	Malathion Methoxychlor Double M 3 qts./acre #P340	15 Gal.	50 Gal.	20 acres Fields across the road from Jones	NE winds at 4 mph, sunny 70°, driver KAP, Alfalfa Weevil
5/14/73 7-9 PM	Johnson's Veal Lice	Root-Lowell	Ciovap 1 oz./animal #24-3	4 gal.	4 gal.	500 calves	Lice on veal calves; calves 5 weeks old, condition good, #47 sick, Helper KAP

RECORD KEEPING AND LIABILITY
UNIT XI

ASSIGNMENT SHEET #1--COMPLETE STANDARD RECORD KEEPING FORM

Complete the standard form based on the information below and the labels on the following pages.

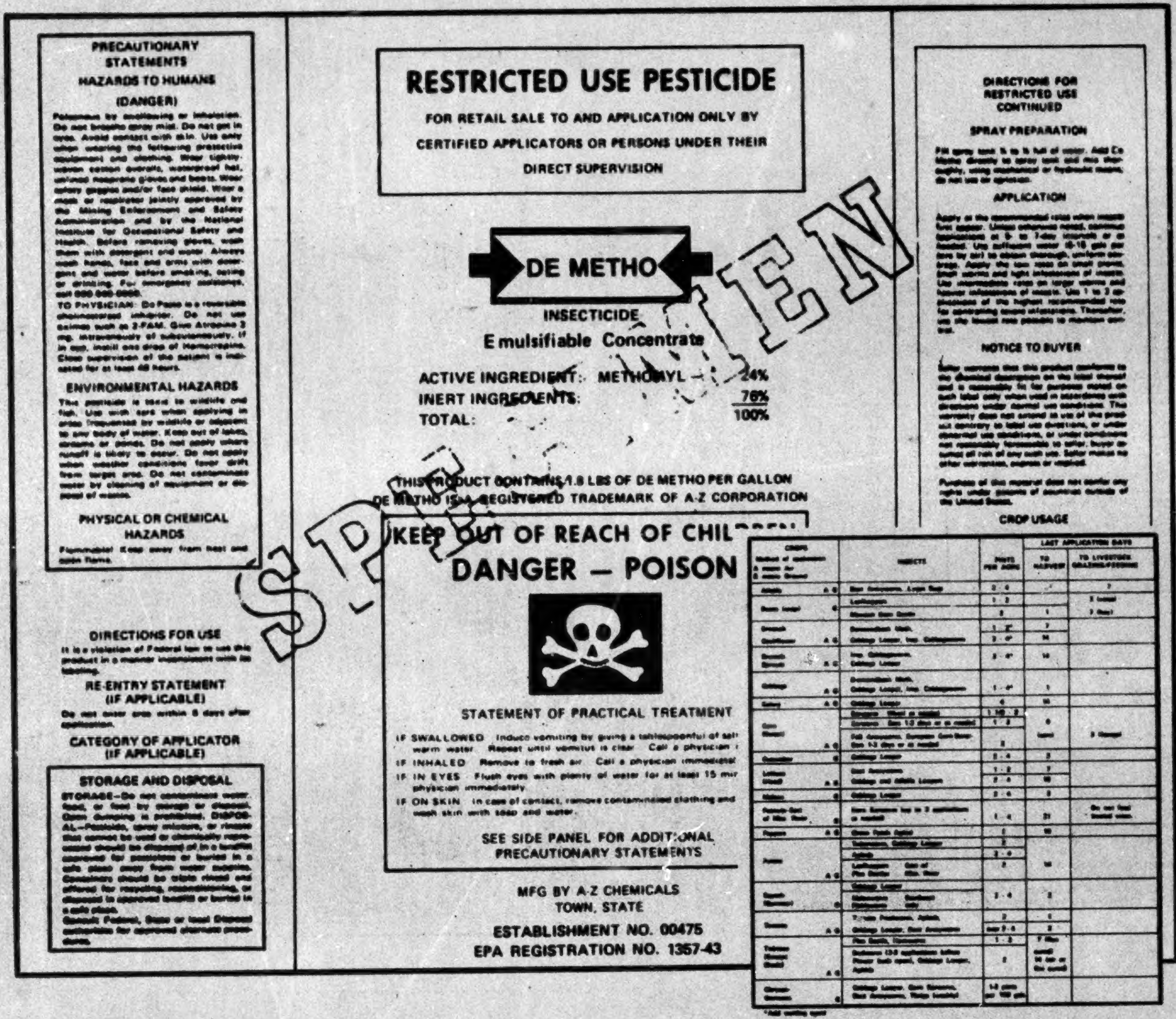
(NOTE: The student should use his/her last name as the owner of the fields.)

1. You sprayed your 6 acre potato field located north of the house for cabbage looper using De Metho. You used a low pressure boom sprayer and sprayed on May 15, 1974, at 8:00 a.m. You had a 150 gallon tank and added 6 quarts to the tank. It took you 30 minutes. The wind was calm; no nearby crops or weeds were in bloom; and there was a heavy infestation.

2. You sprayed your snap beans for white rot on May 15, 1974, at 9:00 a.m. You used a low pressure boom sprayer and sprayed all 10 acres of beans in the field southeast of the barn. You were expecting a severe infestation and added 20 pounds of No-Disease to your 400 gallon tank. It took you an hour; the wind was calm; no nearby crops or weeds were in bloom.

	Date and Time	Area or Target Treated and Pest	Equipment	Formulation, Lot Number, and Rate (per acre, per 100 gallons, etc.)	Total Formulation Added to Tank or Hopper	Amount of Mixture Used	Amount Treated and Location	Additional Comments (Weather, applicator, severity of infestation, etc.)
1.								
2.								

ASSIGNMENT SHEET #1



PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS (DANGER)

TO PHYSICIAN:

ENVIRONMENTAL HAZARDS

PHYSICAL OR CHEMICAL HAZARDS

DIRECTIONS FOR USE

RE-ENTRY STATEMENT (IF APPLICABLE)

CATEGORY OF APPLICATOR (IF APPLICABLE)

STORAGE AND DISPOSAL

RESTRICTED USE PESTICIDE

FOR RETAIL SALE TO AND APPLICATION ONLY BY CERTIFIED APPLICATORS OR PERSONS UNDER THEIR DIRECT SUPERVISION

DE METHO

INSECTICIDE

Emulsifiable Concentrate

ACTIVE INGREDIENT:	METHOMYL	24%
INERT INGREDIENTS:		76%
TOTAL:		100%

THIS PRODUCT CONTAINS 1.8 LBS OF DE METHO PER GALLON

DE METHO IS A REGISTERED TRADEMARK OF A-Z CORPORATION

SPECIMEN

KEEP OUT OF REACH OF CHIL

DANGER — POISON

STATEMENT OF PRACTICAL TREATMENT

IF SWALLOWED Induce vomiting by giving a tablespoonful of sal warm water. Repeat until vomitus is clear. Call a physician

IF INHALED Remove to fresh air. Call a physician immediatel

IF IN EYES Flush eyes with plenty of water for at least 15 mir physician immediately.

IF ON SKIN In case of contact, remove contaminated clothing and wash skin with soap and water.

SEE SIDE PANEL FOR ADDITIONAL PRECAUTIONARY STATEMENTS

MFG BY A-Z CHEMICALS
TOWN, STATE

ESTABLISHMENT NO. 00475
EPA REGISTRATION NO. 1357-43

DIRECTIONS FOR RESTRICTED USE CONTINUED

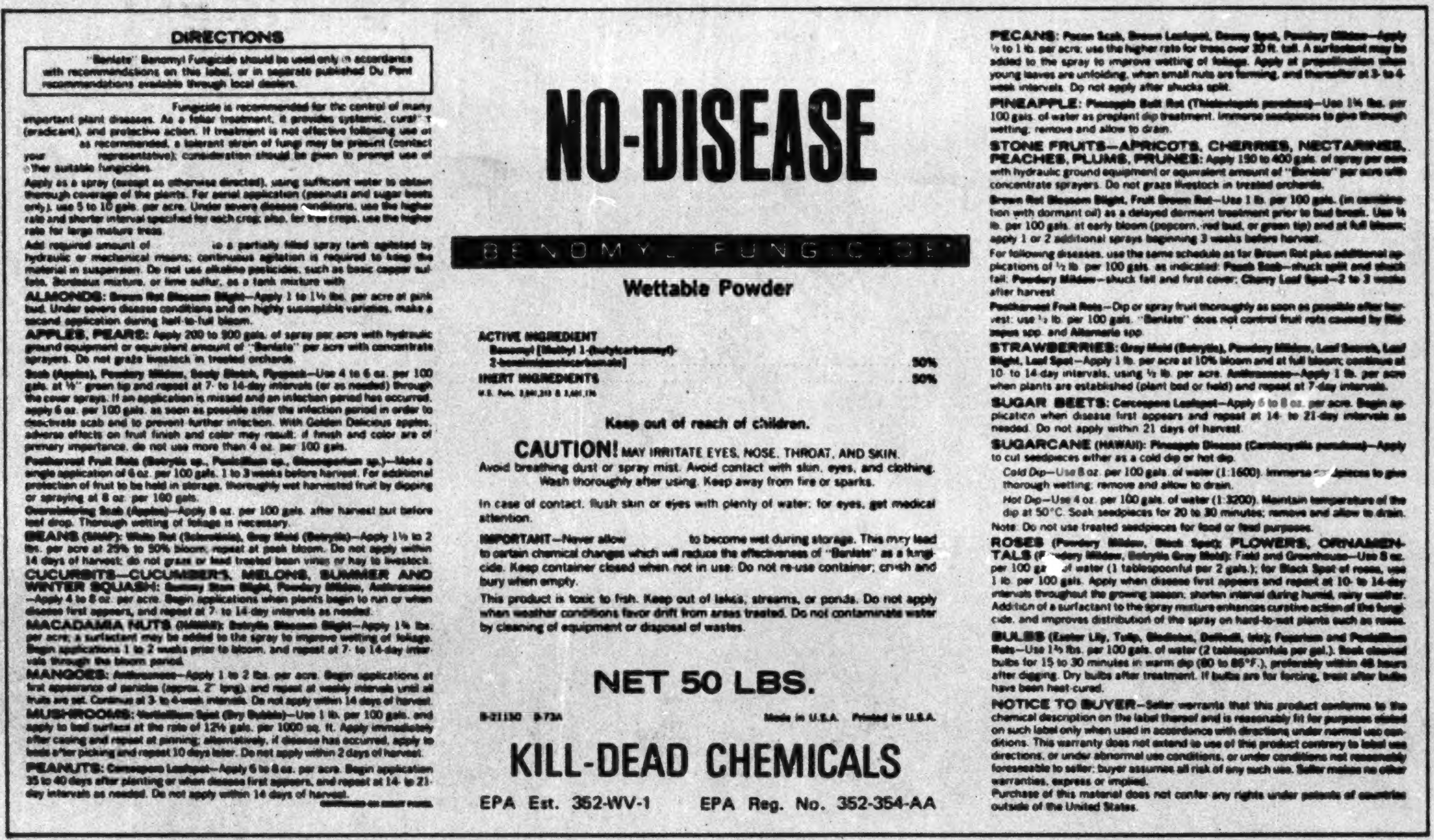
SPRAY PREPARATION

APPLICATION

NOTICE TO BUYER

CROP USAGE

ASSIGNMENT SHEET #1



DIRECTIONS

"Benlate" Benomyl Fungicide should be used only in accordance with recommendations on this label, or in separate published Du Pont recommendations available through local dealers.

Fungicide is recommended for the control of many important plant diseases. As a foliar treatment, it provides systemic, curative (eradicant), and protective action. If treatment is not effective following use of as recommended, a tolerant strain of fungi may be present (contact your representative); consideration should be given to prompt use of other suitable fungicides.

Apply as a spray (except as otherwise directed), using sufficient water to obtain thorough coverage of the plants. For aerial application (peanuts and sugar beets only), use 5 to 10 gals. per acre. Under severe disease conditions, use the higher rate and shorter interval specified for each crop; also, for tree crops, use the higher rate for large mature trees.

Add required amount of to a partially filled spray tank agitated by hydraulic or mechanical means; continuous agitation is required to keep the material in suspension. Do not use alkaline pesticides, such as basic copper sulfate, Bordeaux mixture, or lime sulfur, as a tank mixture with

ALMONDS: **Brown Rot Blossom Blight**—Apply 1 to 1½ lbs. per acre at pink bud. Under severe disease conditions and on highly susceptible varieties, make a second application during half-to-full bloom.

APPLES, PEARS: Apply 200 to 300 gals. of spray per acre with hydraulic ground equipment or equivalent amount of "Benlate" per acre with concentrate sprayers. Do not graze livestock in treated orchards.

Scab (Apples), Powdery Mildew, Sooty Blotch, Flyspeck—Use 4 to 6 oz. per 100 gals. at ½" green tip and repeat at 7- to 14-day intervals (or as needed) through the cover sprays. If an application is missed and an infection period has occurred, apply 6 oz. per 100 gals. as soon as possible after the infection period in order to deactivate scab and to prevent further infection. With Golden Delicious apples, adverse effects on fruit finish and color may result; if finish and color are of primary importance, do not use more than 4 oz. per 100 gals.

Postharvest Fruit Rots (Botrytis sp., Penicillium sp., Gloeosporium sp.)—Make a single application of 6 oz. per 100 gals. 1 to 3 weeks before harvest. For additional protection of fruit to be held in storage, thoroughly wet harvested fruit by dipping or spraying at 8 oz. per 100 gals.

Overwintering Scab (Apples)—Apply 8 oz. per 100 gals. after harvest but before leaf drop. Thorough wetting of foliage is necessary.

BEANS **(SNAP):** **White Mold (Sclerotinia), Gray Mold (Botrytis)**—Apply 1½ to 2 lbs. per acre at 25% to 50% bloom; repeat at peak bloom. Do not apply within 14 days of harvest; do not graze or feed treated bean vines or hay to livestock.

CUCURBITS—CUCUMBERS, MELONS, SUMMER AND WINTER SQUASH: **Gummy Stem Blight, Powdery Mildew, Anthracnose**—Apply 4 to 8 oz. per acre. Begin applications when plants begin to run or when disease first appears, and repeat at 7- to 14-day intervals as needed.

MACADAMIA NUTS **(HAWAII):** **Botrytis Blossom Blight**—Apply 1½ lbs. per acre; a surfactant may be added to the spray to improve wetting of foliage. Begin applications 1 to 2 weeks prior to bloom, and repeat at 7- to 14-day intervals through the bloom period.

MANGOES: *Anthracnose*—Apply 1 to 2 lbs. per acre. Begin applications at first appearance of panicles (approx. 2" long), and repeat at weekly intervals until all fruits are set. Continue at 3- to 4-week intervals. Do not apply within 14 days of harvest.

MUSHROOMS: **Verticillium Spot (Dry Bubble)**—Use 1 lb. per 100 gals. and apply to bed surface at the rate of 12½ gals. per 1000 sq. ft. Apply immediately after casing and repeat at pinning; alternatively, if disease has occurred, apply to beds after picking and repeat 10 days later. Do not apply within 2 days of harvest.

PEANUTS: **Cercospora Leafspot**—Apply 6 to 8 oz. per acre. Begin application 35 to 40 days after planting or when disease first appears, and repeat at 14- to 21-day intervals as needed. Do not apply within 14 days of harvest.

CONTINUED ON RIGHT PANEL

NO-DISEASE

BENOMYL FUNGICIDE

Wettable Powder

ACTIVE INGREDIENT	
Benomyl [Methyl 1-(butylcarbamoyl)-2-benzimidazolecarbamate]	50%
INERT INGREDIENTS	50%

U.S. Pats. 3,541,213 & 3,631,176

Keep out of reach of children.

CAUTION! MAY IRRITATE EYES, NOSE, THROAT, AND SKIN.
Avoid breathing dust or spray mist. Avoid contact with skin, eyes, and clothing. Wash thoroughly after using. Keep away from fire or sparks.

In case of contact, flush skin or eyes with plenty of water; for eyes, get medical attention.

IMPORTANT—Never allow to become wet during storage. This may lead to certain chemical changes which will reduce the effectiveness of "Benlate" as a fungicide. Keep container closed when not in use. Do not re-use container; crush and bury when empty.

This product is toxic to fish. Keep out of lakes, streams, or ponds. Do not apply when weather conditions favor drift from areas treated. Do not contaminate water by cleaning of equipment or disposal of wastes.

NET 50 LBS.

8-21130 8-73A Made in U.S.A. Printed in U.S.A.

KILL-DEAD CHEMICALS

EPA Est. 352-WV-1 EPA Reg. No. 352-354-AA

PECANS: **Pecan Scab, Brown Leafspot, Downy Spot, Powdery Mildew**—Apply ½ to 1 lb. per acre; use the higher rate for trees over 30 ft. tall. A surfactant may be added to the spray to improve wetting of foliage. Apply at pregollination when young leaves are unfolding, when small nuts are forming, and thereafter at 3- to 4-week intervals. Do not apply after shucks split.

PINEAPPLE: **Pineapple Butt Rot (Thielaviopsis paradoxa)**—Use 1½ lbs. per 100 gals. of water as preplant dip treatment. Immerse seedpieces to give thorough wetting; remove and allow to drain.

STONE FRUITS—APRICOTS, CHERRIES, NECTARINES, PEACHES, PLUMS, PRUNES: Apply 150 to 400 gals. of spray per acre with hydraulic ground equipment or equivalent amount of "Benlate" per acre with concentrate sprayers. Do not graze livestock in treated orchards.

Brown Rot Blossom Blight, Fruit Brown Rot—Use 1 lb. per 100 gals. (in combination with dormant oil) as a delayed dormant treatment prior to bud break. Use ½ lb. per 100 gals. at early bloom (popcorn, red bud, or green tip) and at full bloom; apply 1 or 2 additional sprays beginning 3 weeks before harvest.

For following diseases, use the same schedule as for Brown Rot plus additional applications of ½ lb. per 100 gals. as indicated: **Peach Scab**—shuck split and shuck fall; **Powdery Mildew**—shuck fall and first cover; **Cherry Leaf Spot**—2 to 3 weeks after harvest.

Postharvest Fruit Rots—Dip or spray fruit thoroughly as soon as possible after harvest; use ½ lb. per 100 gals. "Benlate" does not control fruit rots caused by Rhizopus spp. and Alternaria spp.

STRAWBERRIES: **Gray Mold (Botrytis), Powdery Mildew, Leaf Scorch, Leaf Blight, Leaf Spot**—Apply 1 lb. per acre at 10% bloom and at full bloom; continue at 10- to 14-day intervals, using ½ lb. per acre. **Anthracnose**—Apply 1 lb. per acre when plants are established (plant bed or field) and repeat at 7-day intervals.

SUGAR BEETS: **Cercospora Leafspot**—Apply 6 to 8 oz. per acre. Begin application when disease first appears and repeat at 14- to 21-day intervals as needed. Do not apply within 21 days of harvest.

SUGARCANE **(HAWAII):** **Pineapple Disease (Ceratocystis paradoxa)**—Apply to cut seedpieces either as a cold dip or hot dip.

Cold Dip—Use 8 oz. per 100 gals. of water (1:1600). Immerse seedpieces to give thorough wetting; remove and allow to drain.

Hot Dip—Use 4 oz. per 100 gals. of water (1:3200). Maintain temperature of the dip at 50°C. Soak seedpieces for 20 to 30 minutes; remove and allow to drain.

Note: Do not use treated seedpieces for food or feed purposes.

ROSES **(Powdery Mildew, Black Spot);** **FLOWERS, ORNAMENTALS** **(Powdery Mildew, Botrytis Gray Mold):** Field and Greenhouse—Use 8 oz. per 100 gals. of water (1 tablespoonful per 2 gals.); for Black Spot of roses, use 1 lb. per 100 gals. Apply when disease first appears and repeat at 10- to 14-day intervals throughout the growing season; shorten interval during humid, rainy weather. Addition of a surfactant to the spray mixture enhances curative action of the fungicide, and improves distribution of the spray on hard-to-wet plants such as roses.

BULBS **(Easter Lily, Tulip, Gladiolus, Daffodil, Iris):** **Fusarium and Penicillium Rots**—Use 1½ lbs. per 100 gals. of water (2 tablespoonfuls per gal.). Soak cleaned bulbs for 15 to 30 minutes in warm dip (80 to 85°F.), preferably within 48 hours after digging. Dry bulbs after treatment. If bulbs are for forcing, treat after bulbs have been heat-cured.

NOTICE TO BUYER—Seller warrants that this product conforms to the chemical description on the label thereof and is reasonably fit for purposes stated on such label only when used in accordance with directions under normal use conditions. This warranty does not extend to use of this product contrary to label use directions, or under abnormal use conditions, or under conditions not reasonably foreseeable to seller; buyer assumes all risk of any such use. Seller makes no other warranties, express or implied.

Purchase of this material does not confer any rights under patents of countries outside of the United States.

RECORD KEEPING AND LIABILITY
UNIT XI

ANSWERS TO ASSIGNMENT SHEET

	Date and Time	Area or Target Treated and Pest	Equipment	Formulation, Lot Number, and Rate (per acre, per 100 gallons, etc.)	Total Formulation Added to Tank or Hopper	Amount of Mixture Used	Amount Treated and Location	Additional Comments (Weather, applicator, severity of infestation, etc.)
1.	5/15/75 8 AM	Student's last Name Potatoe field for cabbage looper	Low pressure boom spray 25 gal/acre	De Metho A-Z chemicals EPA Reg. no. 1357-43 EPA Est. no 0475 2 pts/acre	6 qts. 12 pts. of 1.8EC	150 gal.	6 acres Field north of house	30 minutes, wind calm, no crops or weeds in bloom, heavy infestation
2.	5/15/74 9 AM	Student's name last Beanfield for white rot	Low pressure boom sprayer 40 gal/acre	No-Disease Kill-Dead Chemicals EPA REG 352-354-AA EPA Est. no. 352-WV-1	20 lb. of 50% WP	400 gal.	10 acres Field southeast of barn	1 hour, heavy infestation, wind calm no nearby crops or weeds in bloom

RECORD KEEPING AND LIABILITY
UNIT XI

TEST

1. List four reasons for keeping records of pesticide use.

   a.

   b.

   c.

   d.

2. List four items of information needed for record keeping.

   a.

   b.

   c.

   d.

3. Name three common claims brought against applicators.

   a.

   b.

   c.

4. List the ways in which cross contamination may occur.

   a.

   b.

   c.

5. Describe three things to do when involved in a legal problem.

   a.

   b.

   c.

6. Discuss insurance for pesticide mishaps.

7. Complete the following standard record keeping form using the information below.

Mr. Green sprayed his 100 calves for hornflies on June 4, 1975, at 8:00 a.m. He used a power sprayer which held 25 gallons of water. Fly-Off 50 was the pesticide used at 2#/25 gallons of water. The chemical was manufactured by A - Z and the E.P.A. number was 352-75-AA. It took 2 hours; the weather was clear; infestation was light. The wind was eight miles per hour.

Date and Time	Area or Target Treated and Pest	Equipment	Formulation, Lot Number, and Rate (per acre, per 100 gallons, etc.)	Total. Formulation Added to Tank or Hopper	Amount of Mixture Used	Amount Treated and Location	Additional Comments (Weather, applicator, severity of infestation, etc.)

RECORD KEEPING AND LIABILITY
UNIT XI

ANSWERS TO TEST

1. Any four of the following:
    a. Help in finding an error if an error is made
    b. Provide information to trace residue and/or damage problems
    c. Help save money
    d. Allow one to compare the results obtained from different pesticides
    e. Help to reduce pesticide misuse
    f. Provide guide to buying specific amount of pesticide needed
    g. Establish proof of proper use in damage suit
2. Any four of the following:
    a. Date and time of application
    b. Area or target treated and pest
    c. Equipment used
    d. Name of product, formulation, lot number, establishment number, and rate
    e. Total formulation added to tank or hopper
    f. Amount of mixture used
    g. Amount treated and location
    h. Additional comments
3. Any three of the following:
    a. Drift
    b. Crop injury
    c. Personal injury
    d. Wrong field
    e. Bees
    f. Attractive nuisance
    g. Noise

4. a. Manufacturer may make a mistake in labeling or formulating the product

    b. Applicator may make a mistake in mixing or filling in the spray tank or he may not have removed from the tank all the pesticide left over from the last application

    c. Open container of herbicides, such as 2,4D, can vaporize (become a gas) and penetrate other pesticides which are stored nearby

5. Description should include any three of the following:

    a. Examine records to make sure that you were actually operating in the area at the time of the alleged injury

    b. Make sure that all of your records are up-to-date, particularly as to the identity of the equipment used, temperatures, wind direction and velocity, and other pertinent data

    c. Proceed to the scene immediately and make notes of all essential information

    d. Record any adverse conditions that you observe at the time of your investigation, particularly insect infestations, disease, water stress, late planting, carry-over effect from other materials or herbicides, and age of crop

    e. Use close-up color photography to record any adverse condition found

    f. Save the container from which the product used on the job was removed

    g. Request permission to have an expert examine the crop or the property in order to have the benefit of his opinion

    h. Notify the chemical company immediately so they can send their experts to the site if they are involved

    i. Obtain the names and addresses of all witnesses who might testify as to the nature of the operation and the conditions of the crop before and after application

6. Discussion should include:

    a. Types of insurance plans

        1) Bodily injury

        2) Property damage

        3) Restricted chemical liability

        4) Comprehensive chemical

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b. Points to consider

1) Cost

2) Benefits

3) Drawbacks

7.

Date and Time	Area or Target Treated and Pest	Equipment	Formulation, Lot Number, and Rate (per acre, per 100 gallons, etc.)	Total Formulation Added to Tank or Hopper	Amount of Mixture Used	Amount Treated and Location	Additional Comments (Weather, applicator, severity of infestation, etc.)
6-4-75 8 AM	Green's hornflies	Power Sprayer	Fly-Off A-Z #352-75-AA 2#/25 gal.	2#	25 gal.	100 calves	2 hrs. weather clear, infestation light, wind 8 mph